

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport.  
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## Flight.

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### TO OUR READERS.

The Supply of "FLIGHT." Important Notice.

Order "FLIGHT" to be either delivered or reserved for you regularly.

As the demand for "FLIGHT" is so great each week, it is of the utmost importance that readers should place their orders *firmly* for copies of "FLIGHT" at the bookstalls, their newsagents, or direct from the publishers, at 44, St. Martin's Lane, W.C., if they wish to secure a copy every week and avoid disappointment. The stringent Government restrictions in regard to the supply of printing paper necessitates this precaution in order that only actual numbers required are printed, and all wastage by unsold copies may thereby be reduced to a minimum, if not eliminated.

THE PUBLISHERS.

### EDITORIAL COMMENT.



THE topic of the hour, to the exclusion of all others, is the German proposal that peace terms should be discussed between the two groups of belligerents. We do not know at this moment upon what terms Germany is prepared to discuss peace, but it may be predicated with perfect safety that those terms are not likely to come within even measurable

distance of even affording a basis for discussion as between the Allied and the Central Powers. It is perfectly obvious from the tone of her Press and from the utterances of her statesmen that Germany is only prepared to agree to a peace that will leave her in the position of a conquering nation. How much of the pose is bluff and how much honest—if one can apply the term to Germany—conviction we know not, nor does it greatly matter for the time being. The point is that that is the attitude taken up, and in all fairness it must be conceded that from the point of view of actual success in the field Germany has a good deal of justification for that attitude. When we regard the map of Europe it would be the merest stupidity to argue that the Germans have not succeeded in their aims of military conquest to an extent which even they, in all probability, never anticipated when they plunged Europe into war. They have practically the whole of Belgium, with 60 per cent. of industrial France, Poland, Serbia, Montenegro, nearly half Roumania, and a substantial slice of Russia wherewith to bargain. On the other side, she has a corner of East Africa as the sole remaining vestige of her former vast Colonial possessions and the sea blockade is undoubtedly imposing a very severe strain upon her internal resources. Unfortunately, these do not constitute a balancing factor—one which with any show of justification we can use to obtain a peace that could be called a drawn game, even if a draw were possible to be regarded as satisfactory.

We doubt very much if there could be found in

the whole of the Allied nations even a substantial minority in favour of a peace on such a basis. Certain it is that such a minority does not exist in Great Britain or in any of her Dominions. Of course, it would be possible to find a few, a very few, who would be content with almost any terms so long as peace could be achieved, but they do not constitute even a "substantial minority."

What is behind the German offer? Is it sincere, or is it merely a proposal intended to be refused with the object of impressing the neutrals and throwing the onus of continuing the war upon the Allies? Is it what has been described as "a clumsy trap" intended to sow discord among the Allied nations? We believe it is meant in all sincerity. Germany wants peace, and feels that she will never be in a better position to get it on her own terms than she is now. She is feeling the economic pressure acutely. While her people are perhaps not actually starving, there is undoubtedly a very serious shortage of food, which is becoming more and more pronounced almost every day. Her credit is exhausted because of the almost total cessation of her international trade. Her shipping industries are bankrupt, and her ships cannot show themselves on the seas. The people are sick of the war to a point which has brought her face to face with the prospect of serious internal trouble. There is thus every reason why Germany should seek for a peace of her own making before the conditions become worse. That is why she has announced that peace is to be had for the asking.

What is to be the reply of the Allied nations? Officially, there has been no reply up to now. Unofficially, the people of the nations arrayed against the German menace have spoken with no uncertain voice. There is to be no German-made peace—there is only one peace possible, and that is the one dictated by a victorious Entente. There is an alternative, which is exceedingly well put by Lord Wrenbury in a letter to *The Times*, in which he says:—

"Let the answer be this: If you (the German peoples) want peace before this fight is fought to a finish, evacuate the countries which you have overrun and oppressed. Let the German peoples themselves, and not their present rulers, then approach us, and we will listen. Until you thus approach us we have nothing to say to you: except that we hope and believe that the day is coming when right shall have conquered might: when courage shall have crushed arrogance: when civilisation shall have strangled savagery, and when we shall have and use the power to dictate terms of indemnity, reparation, and punishment for the greatest crime the world has ever known.

"What is the use of discussing terms with those who pledge their word only to break it: who regard treaties as only a disguise to conceal other political aims? Who would agree, for instance, to limitation of armaments with those who would forthwith surreptitiously increase their own offensive power in reliance on the other contracting parties reducing theirs?"

That is the sane, the only possible view to be taken of the situation, and one which during many past months has been set forth in "FLIGHT." That the German people will adopt it at this juncture we

have no reason to hope or believe. That being so, there is but one conclusion to be reached: that the war must be prosecuted to its bitter end and until the whole of the task to which we have set ourselves has been accomplished. That it can be accomplished we have the fullest confidence. Germany is at her zenith, while the Allies are only now reaching the point at which their full resources can be employed. Germany knows this as well as we do, and that is the governing reason of her willingness to discuss terms for ending the war. But we cannot, we dare not, listen to the voice of the peacemonger. No, this war was none of our seeking, but now we are committed we cannot stultify all our past history and traditions by leaving unfinished the work to which we have set ourselves. Rather must we strain every nerve, every resource, for the task that is before us, a task which we can pursue with renewed hope and confidence born of the confession of German weakness displayed in this effort for peace. For it is a confession of weakness, no matter how the German Press and her public men may try to gloss it over by tall talk. We know enough of the internal condition of Germany to be very certain that she would welcome peace as ardently as she welcomed war in August of 1914. Then, she had war on *her* terms. In December of 1916 our reply must be that we only want peace on *our* terms. We know exactly what this means. We have been told by the German Press that if we reject the overtures, it must be a fight to a finish, in which either Germany or the British Empire must disappear from the roll of nations. The challenge has no terrors—we can accept it with confidence in whatever the future may bring forth. Better that the British Empire should disappear than that it should live a dishonoured existence under a German hegemony.

♦ ♦ ♦

Air Supremacy after the War.

From time to time in the columns of "FLIGHT" we have urged that the problem of maintaining our aerial supremacy after the war is one of paramount interest, and one that for many reasons should receive urgent attention at the hands of those who are identified in any shape or form with the great movement of aviation. We welcome, therefore, the excellent expressions of opinion contained in an article by the motoring correspondent of the *Daily Telegraph*, in which the future of the aviation industry after the war is discussed at some length. These opinions coincide so well with those we have frequently expressed, and which we believe to be thoroughly sound, that we feel we need make no apology to our readers for quoting from them. As he points out:—

"In this country the production of aeroplane engines, parts, chassis, and the complete machine, has reached a very high state of efficiency. But we must not stop here—without continued effort no improvements will be made. No orders after the war will mean no works, and the commercial aspect is usually the only point of view recognised. It is practically certain that it will be impossible for the Government to place orders on the present generous scale, but other orders will have to be found to keep the works alive and enable them to improve the



aeroplane, both as a fighting weapon and as a commercial concern.

"In the early days of motor cars a few wealthy amateur sportsmen kept the industry going until it became a sound commercial proposition. The aeroplane has developed on somewhat similar lines, only much quicker owing to the war. It has reached, in fact, such a pitch of perfection that the few rich men and women who may keep an aeroplane to go to the Riviera, as they keep a car to go shopping, will be insufficient to encourage the production of, say, 1,000 complete machines a week, which should be the minimum output. No doubt many of the countries, now at peace with the world, will give some of the British aeroplane manufacturers orders after the war, but it is not wise 'to count such chickens before they are hatched.' It behoves, therefore, those in this country who believe in aerial supremacy to face the position of affairs and endeavour to arrange that the good work should go on. It is well known that machines can be built to carry from two tons to eight tons load, and, perhaps, even more, so the commercial world may consider them as goods carriers or passenger transporters. Moreover, the flight across the Atlantic from England to America is not beyond our powers; indeed, there is every probability of that event taking place in our time. But to ensure it proper encouragement must be given to the aeroplane designer and manufacturer. "One might specify one hundred different schemes for the use of aeroplanes besides those in which they are at present engaged. No doubt each project would find some critic to belittle it, but for the national welfare it is necessary to inquire into and foster all plans. At present our united aims are to win the war, but it is not wise to neglect the future, and the prospects of the aeroplane industry will be poor indeed when peace arrives, unless steps are taken before then to ensure its continuance on lines worthy of its vast resources in Great Britain and the Empire beyond the seas.

There is really no need for us to elaborate the points raised. We agree absolutely that if the industry is to be preserved and maintained both the State and the individual must combine in a common effort to keep this country at the head of the aerial Powers. It is not a matter of bolstering up an industry for the profit of the individuals concerned in it—it is a question of national safety that is involved. We have been caught napping once, and our motto must be: "Never again!"

#### The Old Clique.

In common with every right-thinking citizen, we had hoped and believed that all questions of "Party" had been shelved, if not permanently, at least for the duration of the war. We have a Government now in whom we feel confidence, and we have faith that if they are allowed to carry out their own policy in their own way they will make good. But what of the influences outside the Government? We confess we do not like the tone of some of the speeches. Mr. McKenna's repeated references, for example, to "the leader of the Liberal Party" do not ring true. The same is to be said of Mr. Runciman's recent speech, which was that of the disappointed politician, and we are glad to note

that on Tuesday Mr. Asquith very emphatically washed his hands of Mr. McKenna's untimely attempt to drag him into such indecent political jobbery. Already there is talk of a "plot" against Mr. Lloyd George, engineered by members of the late Administration. We can scarcely credit the existence of a cabal against the new Cabinet, though we know the professional politician to be capable of anything in his quest of the sweets of office. But assuming that anything of the kind does in fact exist, those who are responsible are taking upon themselves a heavy and a dangerous responsibility. They will find that the country is in no mood to tolerate the machinations of those who prefer the interests of Party to those of the State. The nation is bent on winning the war, and it will have scant mercy for any who attempt to stand in the way. It might have been thought that the old political clique would have by this time discovered that the nation has no use for them and that their best course would be to retire into the obscurity to which they belong. If they have not assimilated that lesson, and if they still labour under the delusion that the nation will tolerate any interference with the conduct of its affairs, we warn them that they are likely to make their last case worse than the first. We have had enough of them, and they must be singularly dense of understanding if they do not realise the fact.

#### The New Cabinet and Aerial Policy.

Already the new Cabinet seems to be making itself felt in matters affecting aerial policy. Speaking in the House on Monday last, Sir Geo. Cave, the new Home Secretary, said it was proposed to create the office of Parliamentary Secretary to the Air Board or alternatively to any authority or Board constituted in connection with the supply of aircraft during the present war. He was authorised to state that owing to pressure of work involved in the formation of the Government, it had not been possible to decide all matters connected with the Air Board. The work of the President was still being carried on by Lord Curzon, and the Government were satisfied that the services were not suffering in the meantime. They were glad to say that the two fighting departments, the War Office and the Admiralty, had arranged to utilise to the full the services of the Air Board.

This is indeed good reading. Even though, in the words of the Home Secretary, it has not been possible to decide everything in a week, the mere fact that the differences between the two fighting services, which have stood in the way of efficient work, have been apparently composed within so short a space of time is eloquent of better things to come. Then, the proposed appointment of a Parliamentary Secretary must mean, if it means anything, that we are to have an Air Board with authority to *do* things and not merely to discuss them in a detached and academic fashion, which is what we have been advocating for many months past in season and out of season.

It is very evident that at last we have an Administration which does realise the paramount necessity of bending every endeavour to the maintenance of

our hardly won supremacy of the air. Its first announcement on the subject, slight as it may be in fact, is a sufficient indication that for the first time since the beginning of the war the Air Service is regarded with the seriousness it deserves. From every point of view this is a matter for satisfaction to every one, and in particular to those who, like

ourselves, have constantly urged upon the Government that it is a matter of the gravest national import that the service should be put upon a proper footing and its affairs removed from the sphere of inter-departmental jealousies. The new Government is much to be congratulated upon the work already accomplished and on the promise of the future.

## FINAL REPORT OF THE COMMITTEE ON THE ADMINISTRATION AND COMMAND OF THE R.F.C.

This report, signed by the Chairman, Mr. Justice Bailhache and the other members of the Committee, was issued on Wednesday, and consists of 25 foolscap pages of printed matter. After dealing in detail with the charges, &c., their recommendations and final remarks are as follows:—

I.—Our first recommendation, and that to which we attach greatest importance, is that the equipment of the Royal Flying Corps should be entirely separated from the executive command. General Henderson's position as Commander of the Royal Flying Corps, responsible for it as a fighting arm and at the same time responsible as Director-General of Military Aeronautics for its equipment, is an impossible position for any man to fill now that the Royal Flying Corps has grown to its present dimensions, and especially in view of its probable further growth. There seems no reason why this change should not be made at once. There are officers on the Directorate of Military Aeronautics who have now sufficient experience to take over equipment and deal with it independently.

Whether there should some day be a united air service combining the Royal Flying Corps and the Royal Naval Air Service we are not in a position to say. However that may be, we see no reason against having one Equipment Department charged with the equipment of both the Army and Navy Flying Services. There would no doubt be inter-Service jealousy to contend with, but that should not be allowed to stop a much needed reform.

There could hardly be a stronger illustration of the need for a united equipment service than the fact that, at the beginning of the war, the manufacturing resources open to the two Services were divided between them without any possible knowledge of how the division would work out in practice, a division which has in fact given rise to many difficulties.

We have seen how separate Equipment Departments for each Service led to friction in France, and how the friction ceased when one officer was sent there for both Services.

A joint Equipment Department would, in our view, tend to abolish competition and friction between the Services and make for increased efficiency.

II.—We think the continued existence of the R.A.F. is essential. It should not, in our opinion, become a manufacturing establishment, but should confine its activities, as at present, to the five subject stated in our Report, namely:—

(1) Trial and experiment. (2) Research. (3) Preparation of drawings. (4) Repairs. (5) Manufacture of spares.

The R.A.F. would need to be controlled by the Equipment Department of Military Aeronautics, but if this department

was entirely divorced from the Royal Flying Corps, much of the Trade jealousy of the R.A.F. would, we hope, disappear.

We would have aeroplanes and engines, whether of private or of R.A.F. design, tested by the Royal Flying Corps at, say, the Central Flying School quite independently of the Equipment Department in any of its branches. It would probably be necessary for this purpose to add to the staff at Upavon mechanical engineers of high standing.

III.—We recommend that, during the war, and until our ideal of interchangeable observers and pilots is reached, observers should receive promotion without having to become pilots, and that a corps of observers be formed with a regular establishment graded for promotion among themselves.

IV.—There are one or two minor recommendations which obviously arise out of our Report, such as the tightening of discipline in the upkeep of school machines. These we do not think it necessary to repeat.

We have finished the duty we were asked to perform. The task of fault-finding, always unpleasant, became more and more distasteful to us as we proceeded with our inquiries. When we look back to the Royal Flying Corps at the outbreak of war setting out with its 100 or so pilots, its 66 aeroplanes for the Front, and with its 20 serviceable ones at home for training, when we remember that none of its engines were of British design, and that it was dependent upon the goodwill of our Allies, the French, for much of its material, and when we see it now increased out of all recognition in numbers and efficiency of its aeroplanes, with their vastly improved engines, its ability to rely upon British manufacturers to supply its needs, its training schools, its aerodromes, its equipment, its pilots and observers, its army of mechanics, it seems as though the Royal Flying Corps is a new creation.

Our admiration is increased when we remember that all the work necessary to bring it into its present state of efficiency has been done while bearing the heavy burdens of rendering such services as the Army required of it in the Field and on the fronts.

A microscopic examination has disclosed some mistakes, as we think. How could it be otherwise? General Henderson has told us that the responsibility is his for such shortcomings as there are. We ascribe them to the difficult position in which he was placed.

The gratitude and thanks which are his due for a great work devotedly undertaken and well done he will, we know, be glad to share with the officers and men who have served under him, whether as Commander of the Royal Flying Corps or as Director-General of Military Aeronautics.

### An Air Ministry at Last.

In the House of Commons on Tuesday, the Home Secretary, Sir George Cave, moved to insert in the New Ministries and Secretaries Bill a clause setting up an Air Board, to consist of a President and other members, for the purpose of organising and maintaining the supply of aircraft in the national interest in connection with the present war. The President will be deemed to be a Minister and the Air Board a Ministry.

The clause was inserted in the Bill, as also was the following clause:—The Air Board shall, in relation to aircraft, have such powers and duties of any Government Department or authority, whether conferred by statute or otherwise, as His Majesty may, by Order in Council, transfer to the Board, or authorise the Board to exercise or perform concurrently with or in consultation with the Government Department or authority concerned.

### D.S.O. for Zepp. Strafer.

HIS MAJESTY THE KING has been graciously pleased

to appoint Temporary Second Lieut. Ian Vernon Pyott, R.F.C., a Companion of the Distinguished Service Order, in recognition of conspicuous gallantry and devotion to duty in connection with the destruction of an enemy airship.

### Another Military Medal for R.F.C.

In the list of men upon whom His Majesty the King has been graciously pleased to award the Military Medal for bravery in the field, announced in the *London Gazette* on December 14th, the following appeared:—

G. 26969 2nd Class Air-Mech. T. ROBINSON, R.F.C., late R. Innis, Fus.

### Recruits Wanted for the Anti-Aircraft Corps.

An opportunity occurs for men over military age who wish to do their bit at home, as there are vacancies for such men to relieve men fit for general service who are now going abroad. The headquarters are at 4, Whitehall Gardens, from where full particulars can be obtained.



# The British Air Service

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

## Royal Naval Air Service. Admiralty, December 12th.

G. H. Murphy granted a temp. commission as Lieut., R.N.V.R., seniority November 11th.  
R. F. P. Abbott, W. C. Johnston, N. I. Larter, and P. W. Jenckes entered as Prob. Flight Officers for temp. service, date November 7th.

Admiralty, December 13th.  
Paymaster (Flight Commr.) H. A. Michell, promoted to the rank of Staff Paymaster, with seniority December 13th.

Admiralty, December 15th.  
The following entered as Prob. Flight Officers for temp. service, to date as stated:—E. T. Langdon and J. F. S. Vaughan, Nov. 3rd; R. T. Eyre and F. S. Strathy, Nov. 5th; C. Becker, H. C. Gooch, W. A. N. Davern, J. H. Forman, C. C. Inderwick, J. N. McAllister, S. F. Everson, and D. F. Murray, Nov. 17th; L. D. Bawlf, Dec. 14th.

Admiralty, December 18th.  
W. P. Rogers granted a temp. commission as Lieut., R.N.V.R., and appointed to "President," for R.N.A.S., dated Dec. 16th.

The undermentioned granted temp. commissions as Lieuts, R.N.V.R., and appointed to "President," additional, for R.N.A.S., all date Dec. 16th: G. J. Pickthall, G. G. Shepherd, A. Gordon and B. A. Castle.

## Royal Flying Corps (Military Wing).

London Gazette, December 12th.

Squadron Commander.—Major I. A. E. Edwards, R.A., from a Flight Comdr. Dec. 1st.

Flight Commanders.—The appointment of Lieut. (Temp. Capt.) C. E. Wardle, S.R., notified in the Gazette of Oct. 12th, is antedated to July 1st. The appointment of 2nd Lieut. (Temp. Capt.) L. F. Hursthouse, S.R., notified in the Gazette of Oct. 16th, is antedated to July 1st. From Flying Officers, and to be Temp. Capt. whilst so employed: 2nd Lieut. (on prob.) E. J. L. W. Gilchrist, M.C., 9th Lrs., S.R.; Nov. 27th. Lieut. B. P. G. Beanlands, Hamps. R.; 1st Dec.

Flying Officers.—Nov. 22nd: 2nd Lieut. (Temp. Lieut.) C. H. Davies, R. Highrs., T.F.; Temp. 2nd Lieut. C. R. W. Knight, Gen. List; Lieut. G. B. R. Schon, M.C., S. Staff. R., from Machine Gun Corps, and to remain secd.; 2nd Lieut. (on prob.) F. I. Fleming, S.R.; Temp. 2nd Lieut. F. K. Crosbie-Choppin, Gen. List. 23rd Nov.: Lieut. W. O. P. Winmill, Bedf. R., from a Flying Officer (Observer), with seniority from June 28th; Temp. 2nd Lieut. R. J. Warner, Gen. List; Temp. 2nd Lieut. A. R. Johnston, Gen. List; Temp. 2nd Lieut. J. E. Lewis, Gen. List; Temp. 2nd Lieut. (on prob.) M. E. Woods, Gen. List. Nov. 24th: Temp. 2nd Lieut. C. S. Cravos, Welsh R. and transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) M. C. Farnes, K.R. Rif. C., and to be transfd. to Gen. List; Temp. 2nd Lieut. G. M. Turnbull, Gen. List. Nov. 25th: 2nd Lieut. H. A. Tracey, S. Wales Bord., and to be secd.; Temp. 2nd Lieut. T. S. Edleston, Gen. List. Nov. 26th: 2nd Lieut. F. MacB. Paul, R. War. R., and to be secd.; Lieut. V. I. Hardy, Suff. R., S.R., and to be secd.; 2nd Lieut. C. B. Riddle, Durh. L.I., T.F.; 2nd Lieut. H. A. Cooper, Lond. R., T.F.; 2nd Lieut. (on prob.) R. B. Lovemore, Lond. R., T.F.; 2nd Lieut. (on prob.) J. C. Rimer, S.R.

Equipment Officers, 3rd Class.—Temp. 2nd Lieut. G. F. F. Collender, Gen. List; May 24th. Temp. 2nd Lieut. F. Jeffcoate, Suff. R., and to be transfd. to Gen. List; Nov. 10th. Temp. 2nd Lieut. A. Wragg, Gen. List; Nov. 21st.

Memoranda.—The undermentioned Warrant Officers from R.F.C., to be 2nd Lieuts. for duty with that Corps. Dec. 7th: Serjt.-Major. F. T. McElwee, Acting Serjt.-Major C. J. Brockbank. 2nd Class Air Mechanic C. Rayner to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; Sept. 28th. (Substituted for the notification in the Gazette of Oct. 11th.)

Supplementary to Regular Corps.—2nd Lieut. G. D. Rae resigns his commission; 13th Dec.)

London Gazette Supplement, December 13th.

Staff Officer, 3rd Class (graded for pay as a Staff Capt.).—Temp. Capt. G. C. Anne, Yorks. L.I., T.F.; Oct. 8th.

Flying Officers.—Temp. 2nd Lieut. K. K. Muspratt, Gen. List; Nov. 2nd. Temp. 2nd Lieut. A. Fraser, Gen. List; Nov. 8th. Nov. 23rd: Temp. Lieut. C. A. F. Whitley, M.C., R. Suss. R., and to be transfd. to Gen. List; Temp. Lieut. G. F. Westcott, Gen. List, from a Flying Officer (Obs.), with seniority from May 31st; 2nd Lieut. G. W. Board, E. Surr. R., S.R., and to be secd.; Temp. 2nd Lieut. B. G. King, Gen. List. Nov. 24th: Temp. 2nd Lieut. M. G. Cole, Gen. List; 2nd Lieut. D. C. Cunnell, Hamps. R., T.F. Nov. 25th: Temp. 2nd Lieut. T. S. Howe, M.C., Gen. List, from a Flying Officer (Obs.), with seniority from May 30th; Lieut. J. Butler, M.C., R. Ir. Fus., and to be secd.; Temp. 2nd Lieut. H. H. McIntosh, Gen. List; 2nd Lieut. (on prob.) C. Sutton, S.R. 2nd Lieut. (Temp. Capt.) M. B. Knowles, Lond. R., T.F.; Nov. 26th. Nov. 27th: Temp. 2nd Lieut. H. D. Davis, Gen. List; Temp. 2nd Lieut. H. S. Robertson, Gen. List; 2nd Lieut. (on prob.) B. H. Godfrey, S.R.; Temp. 2nd Lieut. V. F. Williams, Gen. List. Nov. 28th: 2nd Lieut. (on prob.) A. Coningham, S.R.; Temp. 2nd Lieut. T. A. Cooch, Worc. R., and to be transfd. to Gen. List.

Flying Officer (Observer).—Temp. Lieut. W. O. T. Tudor-Hart, M.C., Northd. Fus., and to be transfd. to Gen. List; June 25th.

Adjutant.—Temp. Capt. F. A. Forde, Gen. List, from a Brig. Major, vice Temp. Capt. F. R. Hedges, Gen. List; Oct. 11th.

Park Commander.—Capt. F. Jolly, S.R., from an Equipment Officer, 1st Cl., and to be Temp. Major whilst so empld.; Dec. 1st.

Equipment Officers, 2nd Class.—From the 3rd Class and to be Temp. Lieuts. whilst so empld. Dec. 1st: 2nd Lieut. C. F. J. North, S.R.; 2nd Lieut. H. W. Mills, S.R.

3rd Class.—2nd Lieut. (on prob.) G. Barnett, S.R.; Nov. 7th.

Memoranda.—The undermentioned to be Temp. Capt.: Temp. 2nd Lieut. G. A. Houghton, for duty with R.F.C.; Oct. 14th. The undermentioned to be Temp. Lieuts. whilst serving with R.F.C. Nov. 1st: 2nd Lieut. R. L. Clegg, Lancs. Fus., S.R.; Temp. 2nd Lieut. J. F. Alcock, Temp. 2nd Lieut. E. R. Cottier, Temp. 2nd Lieut. H. Thrower. The undermentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: Petty Officer A. G. D. West, from R.N.V.R., Nov. 8th; Temp. 2nd Lieut. F. W. Byrne, from Res. of Off., R. Mar., Dec. 14th.

Supplementary to Regular Corps.—2nd Lieut. (on prob.) H. V. Phippen resigns his commission; Dec. 14th. The probationary appointments of the undermentioned 2nd Lieuts. are cancelled, under the provisions of para. 221, Regulations for Officers of the Special Reserve. Dec. 14th: H. Cockroft, W. J. Pike, G. N. B. Baynes.

London Gazette Supplement, December 14th.

Adjutants.—2nd Lieut. (Temp. Lieut.) A. H. Stradling, Gord. Highrs., T.F., and to retain his temp. rank whilst so empld., vice Lieut. R. Whitaker, Rif. Brig.; Nov. 13th. Lieut. R. C. Morgan, Canadian Art.; Nov. 15th.

Supplementary to Regular Corps.—The undermentioned 2nd Lieuts. (on prob.) are confirmed in their rank: B. H. Godfrey, A. Coningham, C. Sutton. The undermentioned to be 2nd Lieuts. (on prob.): A. Glynne; Oct. 6th. D. R. Munro; Nov. 21st. A. W. Chapman; Nov. 27th. E. H. Wilding; Dec. 8th.

London Gazette, December 15th.

Flight Commander.—Capt. C. Cooper, R.W. Surr. R., S.R., from a Flying Officer; Dec. 3rd.

Equipment Officers, 2nd Class.—From the 3rd Class, Nov. 1st: Lieut. H. K. Maxwell, S.R. And to be Temp. Lieut. whilst so empld.: 2nd Lieut. H. L. Saunders, S.R.

London Gazette Supplement, December 16th.

Flying Officers (Observers).—Temp. Lieut. C. N. Jones, Notts. and Derby R.; Oct. 31st. Temp. 2nd Lieut. C. Curtis, Middx. R., and to be transfd. to Gen. List; Nov. 5th. Nov. 15th: 2nd Lieut. H. C. Benstead, N. Staff. R., T.F.;

2nd Lieut. (on prob.) F. S. Andrews, S.R. Dec. 1st: Lieut. J. C. Perkins, W. York. R., S.R.; Temp. Lieut. A. P. Wilson, High. L.I., and to be transfd. to Gen. List; 2nd Lieut. R. L. M. Jack, Gord. Highrs., T.F.; Temp. 2nd Lieut. (on prob.) G. W. B. Bradford, Gen. List.

*Equipment Officer, 1st Class.*—Temp. Lieut. (Temp. Capt.) R. Whiddington, Hamps. Aircraft Parks, T.F., and to retain his temp. higher rank whilst so empld.; Nov. 25th.

*3rd Class.*—Temp. 2nd Lieut. L. P. Ball, Gen. List; Oct. 1st, 2nd Lieut. (on prob.) R. A. W. Collet, S.R.; Oct. 30th.

*Memoranda.*—The undermentioned 2nd Lieuts. to be Temp. Lieuts. whilst serving with R.F.C. Nov. 1st: J. E. H. Bibby, R. W. Fus.; F. Sowrey, D.S.O., R. Fus.; G. H. C. Crooke-Rogers, Worc. R.; E. P. Roberts, R. Suss. R.; T. C. H. Lucas, Suff. R.; H. R. Vagg, Som. L.I.; E. Page, Middx. R.; C. R. Robbins, R.H. and R.F.A.; H. M. Golding, Glouc. R.; S.R.; B. N. Goudge, Leic. R., S.R.; J. D. Canning, N. Staff. R., S.R. The undermentioned 2nd Lieuts. (on prob.) to be Temp. Lieuts. whilst serving with R.F.C. Nov. 19th: C. H. Knight, Dorset R., S.R.; N. Brearley, M.C., Lpool. R., S.R.; D. G. A. Allen, Durh. L.I., S.R. The undermentioned Temp. 2nd Lieuts. to be Temp. Lieuts. whilst serving with R.F.C. Nov. 1st: N. L. Robertson, L. B. Williams, J. W. Shaw, Flight Sergt. F. Adams, from R.F.C., to be 2nd Lieut. for duty with R.F.C.; Dec. 17th. Sergt. H. E. Hotchin, from R.F.C., to be Temp. 2nd Lieut. (on prob.) for duty with the Mil. Wing of that Corps; Dec. 5th.

*London Gazette Supplement, December 18th.*

*Flying Officers.*—2nd Lieut. J. S. Brasell, Australian Flying Corps; Nov. 2nd. 2nd Lieut. L. S. M. Page, R. East Kent. Yeo. (T.F.); Nov. 5th. 2nd Lieut. A. T. Cole, Australian Flying Corps; Nov. 7th. Nov. 12th: 2nd Lieut. (Temp. Lieut.) W. Smith, Lond. R. (T.F.); 2nd Lieut. (Temp. Lieut.) J. A. Middleton, East Lan. Big., R.F.A. (T.F.); 2nd Lieut. T. B. Morris, R.W. Fus. (T.F.); Temp. 2nd Lieut. A. N. Leckler, Manch. R., and to be transfd. to the Gen. List. Nov. 13th: Temp. 2nd Lieut. (on prob.) R. N. Dobbyn, Gen. List. Nov. 23rd: Temp. Lieut. G. G. Moore, Gen. List, from a Flying Officer (Ob.); Nov. 24th, but with seniority from June 21st. Nov. 28th: 2nd Lieut. A. W. Hogg, Sco. Horse Yeo. (T.F.); Temp. 2nd Lieut. E. R. Pennell, Gen. List; Temp. 2nd Lieut. H. P. Rushforth, Gen. List. Nov. 29th: Temp. Lieut. W. F. Fletcher, Machine Gun Corps, and to be transfd. to the Gen. List; Temp. 2nd Lieut. S. Blair, from att'd. 17th Lrs., and to be transfd. to Gen. List. Nov. 30th: Temp. 2nd Lieut. A. C. Randall, Bord. R., and to be transfd. to the Gen. List;

2nd Lieut. E. A. Packe, Oxf. and Bucks. L.I., from a Flying Officer (Ob.), with seniority from June 21st; 2nd Lieut. (on prob.) W. F. Dobson, Spec. Res. Dec. 1st: 2nd Lieut. D. J. Honer, W. Rid. Brig., R.F.A. (T.F.); 2nd Lieut. (on prob.) V. T. Norminton, Spec. Res.; Temp. 2nd Lieut. (on prob.) A. Lindley, Gen. List; 2nd Lieut. (on prob.) E. Armitage, Spec. Res.

*Flying Officers (Observers).*—Lieut. C. Barry, R. Ir. Regt., and to be sec'd.; Oct. 15th. Nov. 1st: Capt. S. R. Penrose-Welsted, R. Ir. Regt., and to be sec'd.; Temp. Capt. F. M. Hicks, 10th Hamps. R., and to be transfd. to the Gen. List; Lieut. T. S. Ivens, Ches. R., and to be sec'd.; Capt. B. G. M. F. Nixon, 41st Dogras, Ind. Army; Nov. 6th. Nov. 10th: 2nd Lieut. (Temp. Lieut.) E. R. Wilkinson, Northd. Fus. (T.F.); 2nd Lieut. J. F. Turner, Ches. R. (T.F.); 2nd Lieut. W. S. Reid, Scot. Horse Yeo. (T.F.); Temp. 2nd Lieut. A. C. Stopher, Garr. Bn., R.W. Fus., and to be transfd. to the Gen. List. 2nd Lieut. V. P. Turner, Australian Imperial Force; Nov. 12th. Nov. 15th: Temp. 2nd Lieut. G. N. Goldie, Arg. and Suthd. Highrs., and to be transfd. to the Gen. List; 2nd Lieut. A. H. Lancaster, Middx. R. (T.F.); Temp. 2nd Lieut. W. H. Winter, R. W. Surr. R.; Temp. 2nd Lieut. J. McDougall, Sea. Highrs., and to be transfd. to the Gen. List; 2nd Lieut. H. W. Bowd, Australian Imperial Force; 2nd Lieut. W. R. Hyam, Australian Imperial Force.

*Equipment Officers, 3rd Class.*—2nd Lieut. H. C. S. Bullock, Gen. List; Oct. 19th. 2nd Lieut. F. Baxter, Kent Fortress Engrs., R.E. (T.F.); Dec. 6th.

*Supplementary to Regular Units or Corps. Royal Flying Corps, Military Wing.*—The undermentioned to be 2nd Lieuts. (on prob.): J. T. Rossiter; Aug. 1st. Nov. 21st: R. Lyon, C. N. Le Mercier, I. C. MacGregor, J. A. Paull, L. Cummings, A. C. Hurst, J. B. Carling, J. A. M. Fleming, C. C. Caldwell, A. I. Murphy, C. B. Fisher, L. J. Scott, H. W. Price, W. L. Harrison, A. V. McPhail, J. H. F. Hambly, R. G. Hamilton, B. B. Perry, G. J. T. Young, J. M. Smith, D'A. F. Hilton, H. O. McDonald, G. B. MacQuarrie, F. W. Curtis, W. P. Scott, D. French, J. L. Boles, G. W. Curtis, M. Montesole, W. H. St. J. Perram, R. M. Smith, E. M. V. Fielding, F. Cain; Dec. 2nd. Dec. 8th: E. W. Brooks, T. Moore, R. H. Grant, A. T. Crook, R. A. Trefese, F. A. Thomas, J. Y. Watson. R. C. S. Jamie; Dec. 14th.

**Royal Flying Corps (Territorial Force).**

*London Gazette, December 15th.*

*Hants Aircraft Parks.*—Lieut. (Temp. Capt.) R. Whiddington is seconded for duty with R.F.C.; Nov. 25th.



## THE ROLL OF HONOUR.

### REPORTED by the Admiralty:—

#### Killed.

Flight-Lieut. J. D. Hume, R.N.

#### Accidentally Killed.

Flight Sub-Lieut. S. V. Trapp, R.N.

#### Accidentally Injured.

Flight-Lieut. R. H. Collett, D.S.C., R.N.

Flight Officer J. P. Everitt, R.N.

### Reported by the War Office:—

#### Killed.

2nd Lieut. H. C. Barr, R.F.C.

2nd Lieut. H. D. Crompton, R.F.A. and R.F.C.

Capt. L. O. Crowther, R.F.C.

2nd Lieut. G. W. Dampier, R.F.C.

2nd Lieut. C. E. Morgan, R.F.C.

Capt. T. A. Tillard, Yeomanry and R.F.C.

5385 1st Air-Mech. A. Allardice, R.F.C.

#### Previously Unofficially, now Officially, reported

#### Killed.

2nd Lieut. R. Barton, R.F.C.

#### Previously reported Missing, now reported Died as a Prisoner of War in German hands.

2nd Lieut. M. M. Mowat, R.F.C.

#### Previously reported Missing, now reported Killed.

Lieut. J. A. Mann, M.C., Cameronians (Scot. Rif.) and R.F.C.

### Wounded.

2nd Lieut. R. B. Davies, Northumb. Fus. and R.F.C.

2nd Lieut. A. B. Fanstone, R.F.C.

2nd Lieut. E. J. L. W. Gilchrist, M.C., Lancers and R.F.C.

Capt. E. O. Grenfell, M.C., R.G.A. and R.F.C.

Lieut. D. M. Murdoch, Essex, att'd. R.F.C.

2nd Lieut. S. Willmet, R.F.C.

### Missing.

2nd Lieut. D. S. Johnson, Cyclist Co. Divl. Mtd. Troops and R.F.C.

25178 Sergt. R. S. Evans, R.F.C.

#### Previously reported Missing, now reported

#### Prisoners of War in German hands.

2nd Lieut. A. R. Crisp, R.F.C.

2nd Lieut. P. F. Heppell, R.F.A. and R.F.C.

2nd Lieut. G. H. Nicholson, R.F.C.

2nd Lieut. B. W. A. Ordish, R.F.C.

2nd Lieut. R. Watts, R.F.C.

2nd Lieut. W. T. Willcox, W. Yorks. and R.F.C.

#### Previously reported Prisoners of War, now reported Wounded and Prisoners of War in German hands.

2nd Lieut. J. V. Bowring, S. Lancs. and R.F.C.

2nd Lieut. J. L. Tibbetts, R.F.C.

#### Previously reported Missing, now reported Wounded and Prisoner of War in German hands.

Lieut. D. Stewart, R.G.A. and R.F.C.



## CONSTRUCTIONAL DETAILS—XVI.\*

IN our last instalment of Constructional Details it was pointed out that the scope for originality in the mounting and cowling of radial air-cooled engines was somewhat limited, owing to the fact that, practically speaking, only one make of engine of this type is in general use—i.e., the Anzani. When, this week, we come to deal with the next type of air-cooled engine, the Vee type, we find that the same complaint of lack of diversity applies almost as much in this case, seeing that the Vee type air-cooled motor is, to all intents and purposes, confined to one representative, the Renault, and its over-much discussed English version, the R.A.F. Without wishing to tire our readers with an attempt to state all the pros and cons. of the R.A.F., a few remarks concerning the problem of effectively cooling an air-cooled engine of the Vee type may be of interest, and help to indicate the reason for the various shields and scoops always associated with the appearance of these engines when in place on an aeroplane.

Arranged as they are in two rows of four or six each, according to the size of the engine, the cylinders cannot, it will be realised, receive a current of air on their front and back sufficient for effective cooling, the following cylinder being shielded by the preceding one. The result is that if the relative current of air due to the forward motion of the machine is relied upon to provide the necessary cooling, the rear cylinders will get much hotter than the front ones, with disastrous results to the power output of the engine. Some additional means must, therefore, be provided to remedy this defect. In the original Renault engines, which were designed for installation in "pushers," the difficulty was overcome by mounting a large enclosed centrifugal fan on the front end of the crankshaft. The space between the cylinders was covered by an arched roof of aluminium running from the tops of the cylinders on one side to the tops of the cylinders on the other. The Vee between the last two cylinders was covered by a vertical aluminium plate. When the fan sucked the air into the space between the two rows of cylinders, the only escape for the air was therefore the small spaces between adjoining cylinders, which were thus cooled on three sides—the inner side and the front and back—by the air delivered by the fan, while the outer sides of the cylinders were cooled by the air current due to the forward motion of the machine. This method of cooling is still retained on M. Farman biplanes and other machines of the "pusher" type, and has stood the test of time admirably. When, however, it comes to building a Renault into a tractor other problems arise.

In the first place the engine is reversed, flying with

\* Previous sets of sketches in this series have appeared as follows:—

Strut sockets	..	Sep. 10	Vee type undercarriages	..	Nov. 5
" "	..	" 17	" "	..	" 12
" "	..	" 24	Wheel undercarriages	..	" 19
" connections, &c.	..	Oct. 1	" "	..	1916.
Wing spar sections	..	" 8	Engine mountings	..	Jan. 6
Streamline struts, sections	..	" 15	" "	..	Apl. 27
Double-skid undercarriages	..	" 22	" "	..	June 8
Single-skid undercarriages	..	" 29	" "	..	Sept. 14

Any of these back numbers can be obtained from "FLIGHT" Office, 44, St. Martin's Lane, price 6d. each, post free.

its propeller end foremost. Unless the fan is to force the air against the relative flow of the surrounding air it would have to be reversed both in direction and in action, seeing that it would now have to exhaust the air from the casing instead of forcing air into it. In the second place, the large helical casing around the fan is of such dimensions as to render it a matter of considerable difficulty to provide space for it in the body of an average tractor machine. Besides, in order to allow the air exhausted by the fan from the space between the cylinders to escape, the portion of the aeroplane body immediately behind the engine would have to be open, a further point against the employment of the fan in a tractor.

The method usually adopted when mounting a Vee type air-cooled engine in a tractor machine is to utilise the relative air current created by the forward speed of the machine without employing any artificially produced auxiliary stream of air from a fan, which latter is, as a matter of fact, left off altogether. The path normally followed by the air around a body moving through it is not, however, in itself sufficient for cooling purposes, as we have already explained, shielding of adjacent cylinders taking place, and means must therefore be devised for directing the air current.

In most tractors fitted with this type of engine the air is directed by scoops or deflector plates in such a manner that it enters the space between the two rows of cylinders from the front, is prevented by a bulk-head or other vertical partition from escaping at the back of the engine, and is forced, by the pressure of the fresh air coming in from the front, out through the spaces between adjacent cylinders. In the older type of B.E.s. a simple deflector of the shape illustrated in one of our sketches was employed, but in more recent ones having engines with twelve instead of eight cylinders a somewhat more complicated arrangement is used.

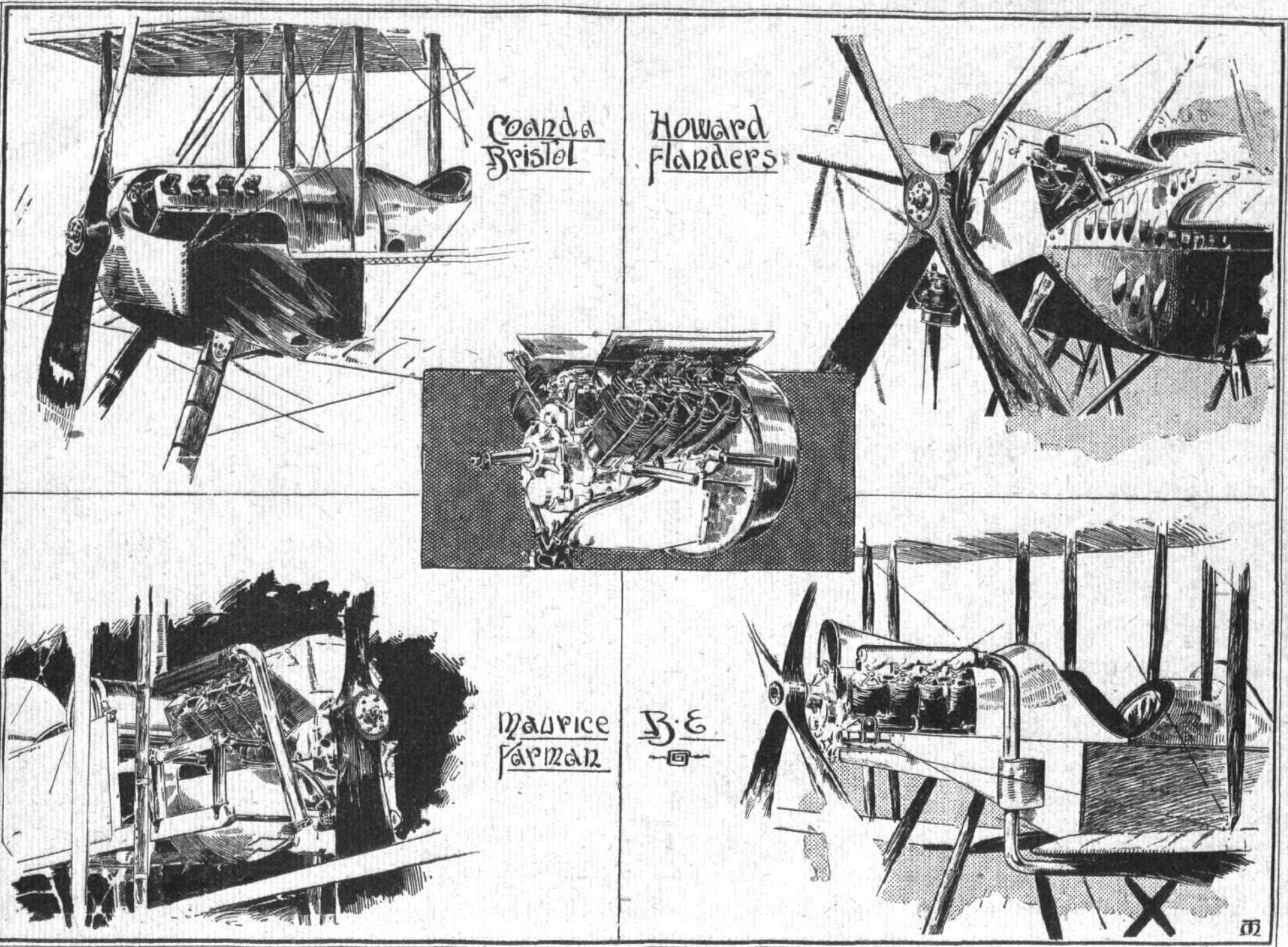
The central sketch in our page of illustrations shows a Renault 8-cylinder engine, with the top aluminium covering open for inspection. At the back of the engine the fan casing can be clearly seen. In the bottom left-hand corner is shown how the Renault is mounted and housed in a M. Farman biplane. This arrangement, with a few minor alterations, is typical of the engine as fitted to machines of the "pusher" type.

Some of the graceful Bristol biplanes designed by Mons. Coanda were fitted with Renault engines, and were of exceptionally clean design as regards their general lines. The way in which this well-known designer tackled the problem of combining sufficient cooling with small resistance is illustrated in our top left-hand corner. The engine was totally covered in, with the exception of the nostril-shaped openings in front and along the sides. The installation on the Flanders monoplanes is illustrated by the sketch in the upper right-hand corner. Here the usual top cover of the engine was retained, air entering the engine housing by way of the triangular openings formed between the downward slope of the upper rails of the body and the engine cover, and escaping via the louvres in the side of the body.

# CONSTRUCTIONAL DETAILS.—XVI.

FLIGHT

DECEMBER 21, 1916.



Mounting and housing of Vee-type air-cooled engines. Inset in centre, the Renault engine, showing tubular bearers.



With regard to the mounting of these engines, it will be seen from the centre sketch that the Renault has two transverse tubes passing through its crankcase. These tubes are provided with a threaded portion, where they enter the crankcase, and nuts serve to adjust and lock the tubes in any position relatively to the engine.

On the B.E.s. a tubular extension of the upper body rails serve as a support for the transverse engine

tubes, which are secured to them by a socket as shown in the sketch. On the M. Farman biplanes the ends of the tubular engine bearers fit into combined sockets and clips bolted to the rails of the nacelle. On the Coanda Bristols these tubes were secured to the upper body rails in a similar manner, while on the Howard Flanders monoplanes they were, if we remember rightly, held in sockets on vertical struts in the body.

## The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

### New Club House.

AFTER Friday next, the 22nd inst., the address of the Club will be 3, Clifford Street, New Bond Street, W.

The new premises will be open to Members on January 3rd, 1917.

### Suspension of Entrance Fees of New Service Members.

Until further notice, Service Members will be elected to the Royal Aero Club without Entrance Fee.

### Annual Subscription.

In accordance with the resolution that was passed unanimously at the Special General Meeting of the Members held on the 27th July, 1916, "the subscription to the Club for the year 1917 and thereafter will be £5 5s."

### Servants' Christmas Fund.

The Subscription List for this Fund is now open.

### THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

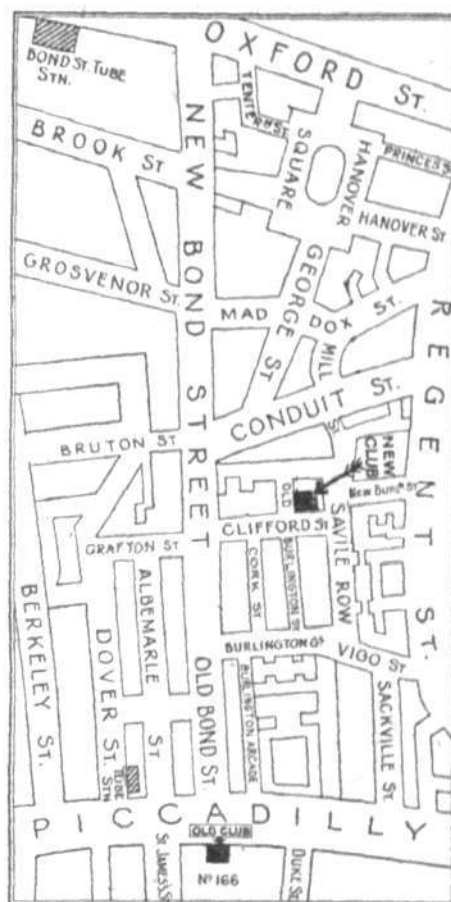
Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

### Subscriptions.

	£	s.	d.
Total subscriptions received to Dec. 12th, 1916	11,098	3	0
Collected at the Westland Aircraft Works, Yeovil (Sixty-first contribution)	0	10	3

Total, December 19th, 1916 .. 11,098 13 3

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.



Plan showing position of New Club Building, 3, Clifford Street, New Bond Street, W., which will be opened on Wednesday, the 3rd January, 1917.

### Flying Pay for the Ranks.

AN Army Order dated December 15th provides that flying pay at the rate of 2s. a day may be issued continuously to qualified non-commissioned officers or air-mechanics, within limits to be determined by the Army Council, who are specially selected for continuous employment on observation duty, provided that flying pay under this Article shall not be issuable concurrently with flying pay under Article 850 of the warrant dated December 1st, 1914, for the pay, &c., of the Army.

### A Gift from Tasmania.

ONE of the latest gifts received by the Overseas League in connection with their Imperial Aerial Fleet scheme, is an aeroplane and £1,500 from a resident of Hobart, Tasmania.

### Captain de Beauchamp Killed.

It was announced in Paris on Tuesday that Captain de Beauchamp, the French pilot who took part in the raid on Krupp's works at Essen on September 23rd, and who also dropped bombs on Munich station on November 17th, had been killed in an air fight in the Douaumont region. His machine fell in the French lines. For his raid on Munich he flew from Nancy, and after bombing Munich, in view of the weather, decided not to fly back; he went on, crossed the Alps and landed in Italy after a journey of nearly 440 miles.

### A German Machine at Havre.

MESSAGES from Havre state that a German machine landed on the Plateau de Rouelle, near that town, on December 12th, and the occupants were taken prisoners by some British soldiers.

## THE ELECTRIC CONTROL OF LARGE AEROPLANES.

By C. T. GLASS-HOOPER.

EVERY day sees some advance in the art of aviation, and for the moment the trend of the evolution of the aeroplane seems to be in the direction of larger and more capacious machines, as owing to the extended nature of modern warfare those machines possessing the widest range are of most general use, and wide range cannot be obtained without increase in size.

With regard to the state of affairs when the present conflict is over it may reasonably be supposed that companies will be promoted for the transport of passengers from one place to another—either by means of hydroplanes, where conditions are suitable, or else aeroplanes. In either case the type of machine needed will be one in which many passengers can be carried, as only by carrying a certain minimum number of passengers can any such project be managed economically. The multi-passenger machine is indeed a fact, and there is at least one passenger air service in existence—notably in Florida, where the Benoist boats fly between St. Petersburg and Tampa. This tendency towards large and heavy machines, with consequently increased lifting surfaces, brings the designer face to face with many new problems on the satisfactory solution of which the future of the heavier-than-air machine depends. Not the least important of these problems is the large amount of power needed to operate the controls—that is to say, the increased elevator; *ailerons* and rudder surfaces seem to demand some form of operating gear less fatiguing to the pilot than the cable and lever systems hitherto universally adopted.

It is fairly evident that the time is not far hence when the claims of electricity in the control system may have to be considered, and it is proposed to here discuss its application to an aeroplane.

It is commonly known that if a current of electricity is sent through a solenoid having a core or armature, the armature will be drawn into or repelled out of the solenoid, depending on the direction of the current. If the armature is attached by means of a link to a lever (such as a rudder or elevator lever) it can be made to pull or push it through an arc, and the amount of travel given to the lever can be altered by varying the current passing through the solenoid. Thus a system of controls could be arranged, which it is here proposed to discuss briefly.

A small dynamo sends current through a few secondary cells which are connected through the control board in the pilot's cockpit to the three controls—elevator, rudder and *ailerons*. The current in each of the three circuits can quickly be varied by a regulator and its value read on an ammeter placed in series between the actuating solenoid and the regulator, thus showing in a visual manner what the pilot in a mechanically operated aeroplane feels by means of the pull on his arms.

The dynamo can be driven either by means of an air screw (as an air pump is sometimes driven nowadays) or could be driven from the main engine through some form of clutch, which would allow the dynamo to be released when necessary (as, for instance, it would be if the main engine should fail).

In this latter case an air screw is also fitted to the dynamo shaft, so that when the connection between it and the engine is severed the armature can still rotate and generate current. This generator would be of the shunt wound type, a suitably designed shunt allowing a fairly constant potential to be delivered in spite of the varying speed. Solenoids are attached to the fixed portion of the elevator, the armatures being connected to the elevator levers. The number of solenoids needed will, of course, depend on the size of the elevator surface, and will be placed on both sides of the elevator.

The rudder control is arranged similarly, the levers being in the horizontal plane here, and the solenoids are attached to the rudder post.

The *ailerons* control follows the same scheme, and as it is usual to employ two or three *ailerons* on each side, each of these must have its solenoids—armatures and levers—and the solenoids must be wired in series. The casings containing the solenoids and armatures could be below the surface of the wing, possibly attached to the rear spar, and a hole left in the fabric for the link connecting the armature and lever.

When the machine is on the ground and when, in the case of the machine driving its dynamo by means of an air screw as mentioned above, its velocity is insufficient to drive the generator at its minimum speed, some means must be provided for energising the solenoids and permitting the controls to be used. This can be arranged very simply by connecting a battery of a few secondary cells in parallel across the leads from the dynamo, and by this means energy can be stored in the battery when it is being generated faster than it is needed, as it would be when flying for any distance without much alteration of controls, or energy can be given to the system when a heavy demand comes on the controls, such as at landing or turning with a good deal of banking. These cells could be of quite small ampère-hour capacity and consequently small in size, and should be of the unspillable type. With regard to the operating gear in the pilot's cockpit this could be of quite a simple nature, the three controls having large ranges of manipulation. And as there would be no reason for the pilot to have all the controls in his hands at once, there could be three separate switches operating the elevator, rudder and *ailerons*. It could be arranged, however, to make the elevator and *ailerons* controls capable of being operated with one hand simultaneously, as they are at present, should that be preferred.\*

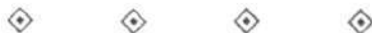
It will doubtless be put forward as a disadvantage of a control system such as this that the pilot will not be able to feel by the pull of his controls just what is happening; but this is not necessarily a disadvantage, for although he may not feel the actual controls pulling his wrists or feet, he can see imme-

[\* As a matter of fact all the controls are usually worked together so that it might be better to fit control levers of the ordinary type—foot-bar and universal lever—and connect them to the switches regulating the elevator and amount of movement of the solenoids.—ED.]



diately he starts using his controls just what forces are being called into action and what loads are coming on his rudder, elevator or *aileron*s, as the case may be, by means of the ammeters on each of those circuits, and also the position of his control switches along their arc of contacts shows him at once the relative positions of the control surfaces in just the same way that the angle through which the control lever or rudder bar is displaced shows the pilot how the movable control surfaces are lying.

Should the dynamo fail, although there is no reason why it should not be capable of running continuously for a very long period, the secondary battery will be capable of supplying sufficient current to enable the machine to be brought to the ground. As to the breaking of the circuits accidentally, by a wire snapping or for some such reason, it is a contingency so unlikely as to be hardly worth consideration, and indeed it is not nearly so liable to occur as a control cable in a mechanically operated machine to break, where the cables are always subjected to stress when in action.



#### To Train Women Workers at Leeds.

A CHANCE for women in the Leeds district to take up aeroplane war work will be in full operation shortly. It is proposed to follow upon the lines which have already proved so successful in London in preparing pupils for their work. The training will be directed by the Leeds Committee for Training Munitions Workers, under the

The principal advantages of a control system such as that described above would mainly lie in the following points:—

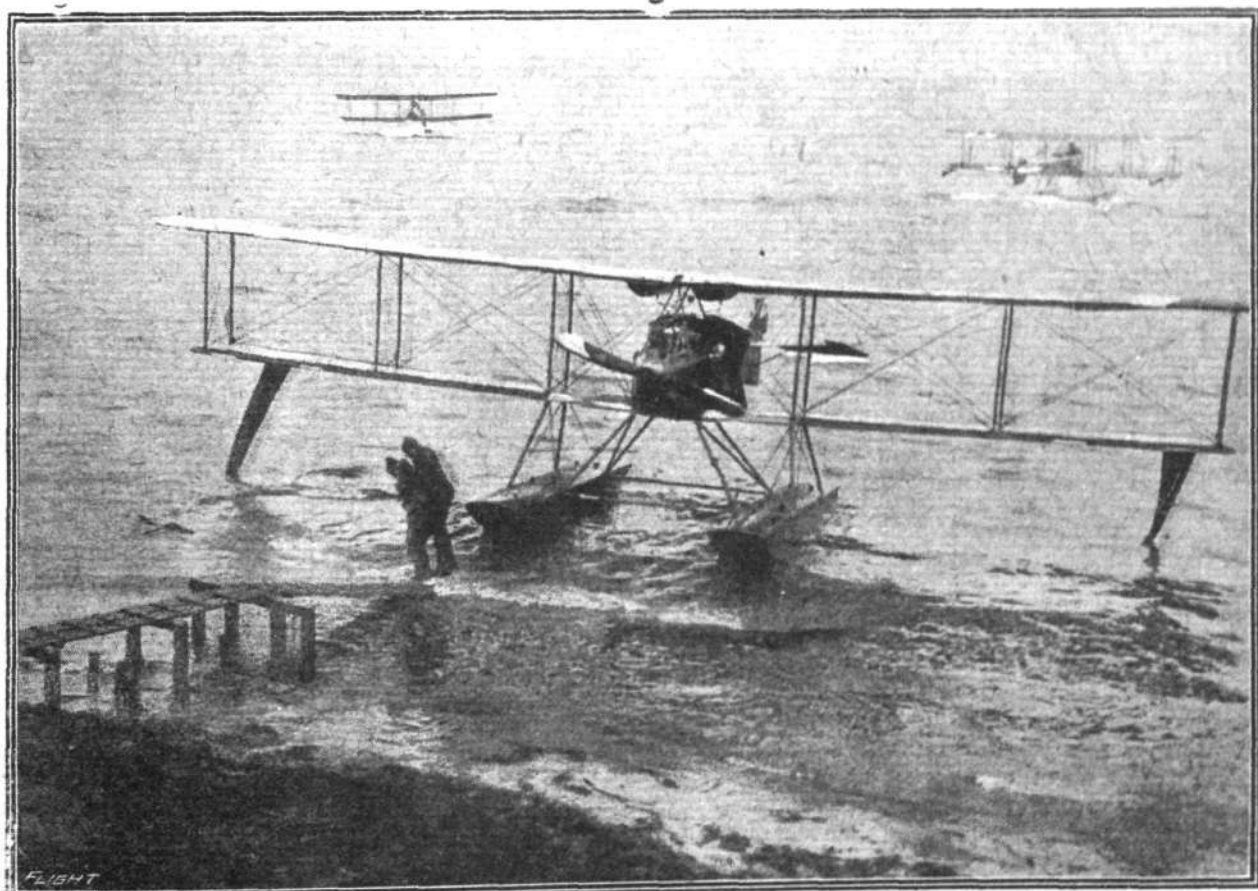
- (1) Operation of the controls requires no muscular exertion on the part of the pilot.
- (2) Ease with which dual control may be installed.
- (3) No need for time to be wasted in tuning up controls, tightening turnbuckles, etc.
- (4) No large outside levers and long cables to increase head resistance.
- (5) Increased space in pilot's cockpit owing to absence of large and cumbersome mechanical controls.

Only by an intelligent anticipation of future requirements can the British aircraft constructor hope to hold his own in the air when the much-talked-of trade boom arrives, and remembering that the race is to the swift it behoves him to look into problems which at the moment may not seem of great importance but which are bound to arise sooner or later.

It is with the intention of indicating one direction in which design will undoubtedly be altered that these words have been written.

authority of the Ministry of Munitions. The work is especially suitable for girls who have had a secondary education.

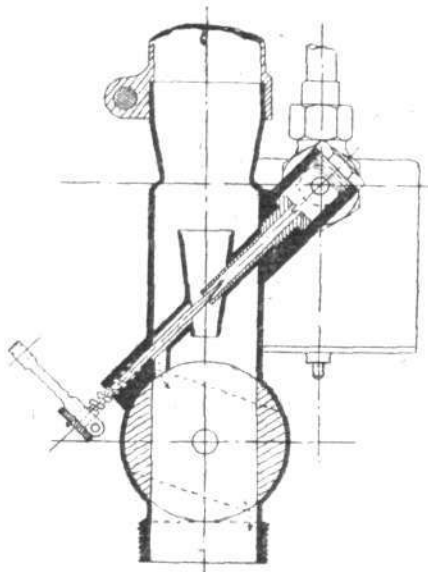
The "school" will probably start about January 2nd at the Leeds Institute, Cookridge Street, and intending applicants should address themselves to the Principal, R. E. Barnett, Central Technical School.



**BACK FROM A SCOUTING EXPEDITION OVER THE NORTH SEA.**—The pilot is being carried ashore from his craft on returning. The machine is of the F.F. 19 type. (The letters F.F. mean Flugzeugbau Friedrichshafen, the German Naval Aircraft Factory.) In the background will be seen two other machines of a similar type.

## THE A.B.C. INJECTOR CARBURETTOR.

ONE of the most fascinating problems in connection with internal combustion engines is that of producing the correct gaseous mixture to suit the varying loads upon the engine, and special interest therefore attaches to a new principle in carburation which has been thought out by Mr. Granville E. Bradshaw, who is well known in connection with A.B.C. Motors, Ltd., of Walton-on-Thames. In the Bradshaw system both compensating devices—for automatically damping out excessive petrol flow with an increased engine speed, and for increasing the suction on the jet according to the



Section of the A.B.C. injector carburettor.

amount of throttle opening—are absolutely progressive, and form a straight line curve. The device has been tested under a great variety of conditions and against well-known makes of carburettors, with most satisfactory results.

Before describing the device in detail, it may be as well to state briefly the two general principles which govern the design of all orthodox automatic carburettors. The first concerns the variations in the proportions of petrol and air which occur as the speed of the engine increases. When, for instance, the load on the engine is lessened, the speed increases (the throttle remaining in the same position), the pressure of air in the choke tube is reduced and more petrol issues from the jet. More air also enters the carburettor, but the quantity is insufficient and the mixture becomes rich. The second principle covers the suction on the jet at various throttle openings. As the closing of the throttle would entail a reduction of the suction effect from the engine, arrangements must be made to increase the suction on the jet, and the variation must be regular, or weak and rich periods will be the result.

In the A.B.C. injector carburettor the object has been to get the full value of the injector principle. From the sectional drawing it will be seen that there are two choke tubes, one placed inside the other in such a manner that the other one induces air into the inner one. By this arrangement it is claimed that as the speed of the air into the carburettor increases, a greater quantity of air is injected into the inner choke tube; and as the jet is situated in there, the pressure round the jet—instead of being greatly reduced, as in the usual run of carburettor, thus permitting an excess of petrol to flow—is slightly increased, and the difference in pressure

between atmospheric pressure in the float chamber and the pressure in the choke tube is not so great as would otherwise be the case. In this system there is no "dead" point, as the action is dependent upon the speed of air into the carburettor, which varies according to the revolutions of the engine, so automatically correcting for increased engine speed with a given throttle opening.

The adjustment of the suction on the jet according to the amount of throttle opening is obtained by a small slow running tube, which goes from the side of the inner choke tube to a point near to the throttle when this is only slightly open. Consequently at small throttle openings the suction is concentrated on the jet, and as the throttle is gradually opened the suction is lessened in proportion to the opening. Thus there is no "dead" point or any break in the operation.

The size of the jet is controlled by a needle which is designed to be used as an "altitude corrector" when fitted to aircraft engines, or as a dashboard regulator when used on motor cars. It has a primary adjustment in the form of a knurled head, which allows the carburettor to be readily tuned up for any engine; a limited movement is then given to the jet control covering any desired range between very weak and very rich, and the carburettor being entirely automatic this control need not be varied with various throttle openings and engine speeds. If the jet control, for instance, is set to "weak" the carburation is weak at all throttle positions and at all engine speeds. Similarly if the "control" is set "rich" the carburation is rich at all throttle positions and engine speeds.

It is claimed that the arrangement of the control needle in the slow-running tube considerably facilitates starting from cold. If the carburettor is flooded to the smallest extent, petrol will squirt from the main jet into the slow-running tube, where it will remain by capillary attraction until the engine is cranked over. This small amount of petrol mixes with the air existing in the induction pipe and readily forms an explosive mixture. The system of jet control has also the advantage of being adjustable to give an excessively rich mixture, which is of considerable assistance where self-starters are fitted, or in the case of old engines where starting is difficult on account of air leaks past worn inlet valve stems. Incidentally, another point in favour of the jet control is the annular jet, which is less likely to become clogged than a plain hole, and in the event of a piece of dirt making a slight stoppage the jet lever can be adjusted either to remove the obstacle or to give a slightly richer mixture until it is convenient to clean it out. The jet control also permits the use of different qualities of fuel without resetting the carburettor.

Another favourable consideration in connection with the carburettor, especially for aircraft work, is that the risk of fire is greatly lessened, as there are no open ports near to the float chamber, the only air passing into the carburettor entering at the mouth of the hot-air intake.

There are no moving parts in the carburettor, and an entire absence of adjusting screws, orifices, &c., which are so liable to be tampered with. There is only one variable, and that can be adjusted without leaving the driving seat. The simplicity of the carburettor permits of it being of substantial design, and as there are no intricate parts there is practically no liability to accidental damage.

The float chamber is of standard pattern, but is bolted to the side of the main jet boss, so that this can be turned through an angle of 90 degrees. As the jet is at an angle of 45 degrees, the carburettor can be used as a "horizontal" or "vertical" at will, and the level in the jet remains constant for either position.

The carburettor is to be marketed in the following sizes: 20, 25, 30, 36, 42 and 48 mm.

### Aeroplanes and Meteorology.

AT the annual meeting in Edinburgh on December 13th of the Scottish Aeronautical Society a paper on "Weather Observation from an Aeroplane," by Lieutenant C. K. M. Douglas, R.F.C., was read. Having been fortunate enough to be for some months this year almost daily amongst the clouds of Northern France, Lieut. Douglas had studied the formation of both stratus and cumulus clouds at close quarters, and submitted some records of the temperature and other conditions under which they developed. A cumulus cloud, which was the visible evidence of a stream of rising air, might give rise to a thunderstorm. Unless, however, the fall of temperature

from the ground upwards was very great thunderstorms would not develop. A knowledge of this temperature gradient was thus very important in the prediction of thundery weather, and Lieut. Douglas put in a plea for the use of the aeroplane in peace time for this purpose, as, in addition, the field of view at a height moderate for an aeroplane was so extensive that distant thunderstorms could easily be observed. He himself had seen clouds 100 miles off from a height of 8,000 ft. The observations made had been quite secondary to observations of a military character, and represented only a very small part of what could be done for meteorology by aeroplane observers.



## Armchair Reflections by the "Dreamer"

ONCE upon a time we went to war, not because we wanted to, but because we had to. Fact of the matter is we had put our name to a little scrap of paper, and when the time came to honour it we started in to do our best.

Just how long ago it is since Germany struck the match that set fire to three-quarters of the world, I have some confusion of thought. It seems to me that it was in the days of my youth, that August Bank Holiday meeting at Brooklands, when there was more talk of war than of racing, when as the big cars flew round the track we all realised that the present was the last racing we should be likely to witness for some considerable time.

For years, it seems, my newspaper used to keep me posted. "Six hundredth day (or was it year?) of the war," it said. "Thirty-fifth day of the battle for Calais. Ninetieth day of the fight for Verdun." It all appears away in the distant past. The newspapers have lost count. Yet I know that we are still at war. By the men in khaki who crowd our streets and trains, by the women doing men's work, by the price of commodities, it is borne in upon me at every hour that we are still at it. I know what it is we are fighting for. Summed up into one word it is Peace, yet when those placards the other day announced that Germany was open to talk peace, the news left me cold.

Germany and peace. Somehow the words do not fit together properly. There does not appear to be any connection of thought. Yet the day must come when peace is with us again, though whether within the next few weeks, months, or years, I do not pretend to guess.

Well, we know what the war has done for aviation; I wonder what peace, when it comes, will do for it. Shall we ever, I wonder, go back to anything resembling the old days? Will Hendon and Brooklands once again become the centres of fashion and sport in the English world of aviation? I think so myself, only even more so. I see no reason why they should not. We are a peace-loving nation, really, although ticketed a warlike race. It takes about a couple of years, usually, for us to get going all out in any war it may happen that we are involved in, but sport comes to us naturally.

Of course, things will be different, almost everything will be after this upheaval. It seems to me that few things will be exactly as they were before. A friend of mine with a business in the City which in pre-war days gave employment to nearly a hundred men, was speaking to me the other day about what would happen in his own particular circle "when the boys come home."

It so happens that something like 80 per cent. of his hands have joined up with the Colours, and as his is a business employing men of good standing,

most of them are now holding their King's commission. He says he cannot for the life of him see Captains and Majors getting back to their desks as plain Mr. this or that, whilst a one-time junior, now wearing the V.C., will in all probability object to being ordered about in the usual way.

Something very similar has happened in aviation. Most of our old Hendon and Brooklands pilots are now away up the tree of promotion. In their case, however, the way is easier, for there is every possibility that most of them will remain in the service of their country. The war has taught the world the value of the aeroplane in warfare, and there is little doubt our flying services will continue to grow and grow when peace is declared, so that there will be plenty of room, not only for those already joined up, but also for those "Pups" now in training to take their place in the R.N.A.S. or the R.F.C. according to their fancy, although one or other, or both, of these services may be called by a totally different name when we have got time to settle matters on a new footing.

Then there are many who are not keen on fighting, many whose breast is not bursting in its endeavours to expand to make room for medals and crosses. These will be the civilian pilots of the future, and there will be plenty of room for those also. But I think the old days of racing round pylones (what a time it is since I wrote that word) are gone for ever. Our ideas have expanded so greatly under a knowledge of the mighty things standing to the credit of aviation, that we can never again content ourselves with anything so paltry as pylone flying. The menu submitted to us will have to contain dishes much more encouraging than that. London-Manchester-London, and London-Paris-London, were actualities before the war; although they were doubtless great events, in the days to come such trivial jaunts will possibly be but the small fry of aviation meetings. This is no great flight of fancy. What I am suggesting as the possible programme of the future does not mean the bridging of nearly such a gap in progress as that separating the Manchester flight of Paulhan and Grahame-White, and the flight over the same course with the return journey added, which fell to the credit of our old friend Brock.

I believe in the days to come we shall have aviation meetings held in such style that those we knew of old will be as nothing; but this, of course, will be after the war, which is not so near, in my opinion, as some people allowed those posters the other day to lead them to think.

To suggest peace is one thing, and to come to peace terms quite another, and if we are going to stick to our word, there are many things for which a reckoning will be required from Germany, things which will be unsavoury to her, yet on which we have sworn that a reckoning shall be had.

## THE GALLAY RADIATORS.

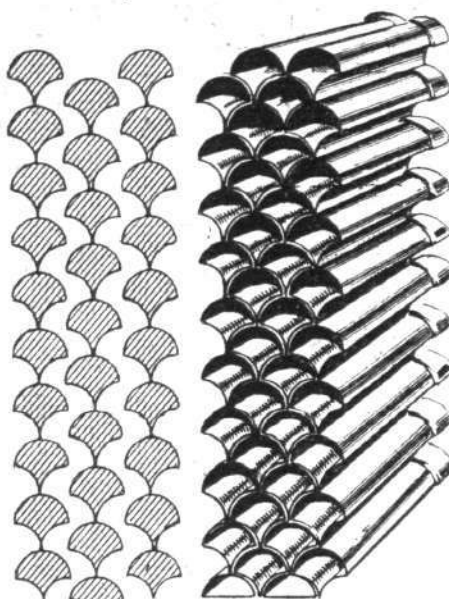
WITH the ever-increasing demand for larger and larger engines, power and yet more power, water cooling comes to the fore in the aviation world in much the same manner as it did in the early days of motoring. Already the limiting size of which it is advisable to make an air-cooled cylinder are fairly well defined, and when this has been reached, as it undoubtedly has in several air-cooled engines, an increase in power can only be obtained by a corresponding increase in the number of cylinders. Here, again, the number of cylinders which it is practicable to incorporate has its limitations, whether the engine be of the Vee, radial or rotary type. Logically, therefore, unless some new principle of air cooling, either by a scavenging stroke or other means, is introduced, it would appear that water cooling will have to be resorted to for the high-powered engines with which our pilots will have to be equipped if they are to have a fair chance of meeting the Germans on a level footing—literally as well as figuratively speaking—in the struggle for supremacy.

That a great deal of experimental work will have to be done, in order to determine the best ways and means of effectively cooling these larger engines, goes without saying. Much will yet have to be done in the way of determining how the greatest cooling effect may be obtained with the smallest amount of resistance, and this would appear to be a subject for such an institution as the National Physical Laboratory rather than for a private manufacturer.

In the meantime, the motor-car radiator can be fairly easily adapted for air work, has, of course, already been so in a number of different types of aeroplanes, although we should not like to say that in so doing the maximum of efficiency has been attained. According to present practice there can be little doubt that the honeycomb type of radiator holds the lead, whether it be mounted in the nose of the machine or elsewhere. In the absence of wind-tunnel tests it is difficult to say whether the square tube, round tube or other formations are best as regards the ratio of cooling capacity to wind resistance. At any rate, on the face of it, it would appear that the form, in which the normal area

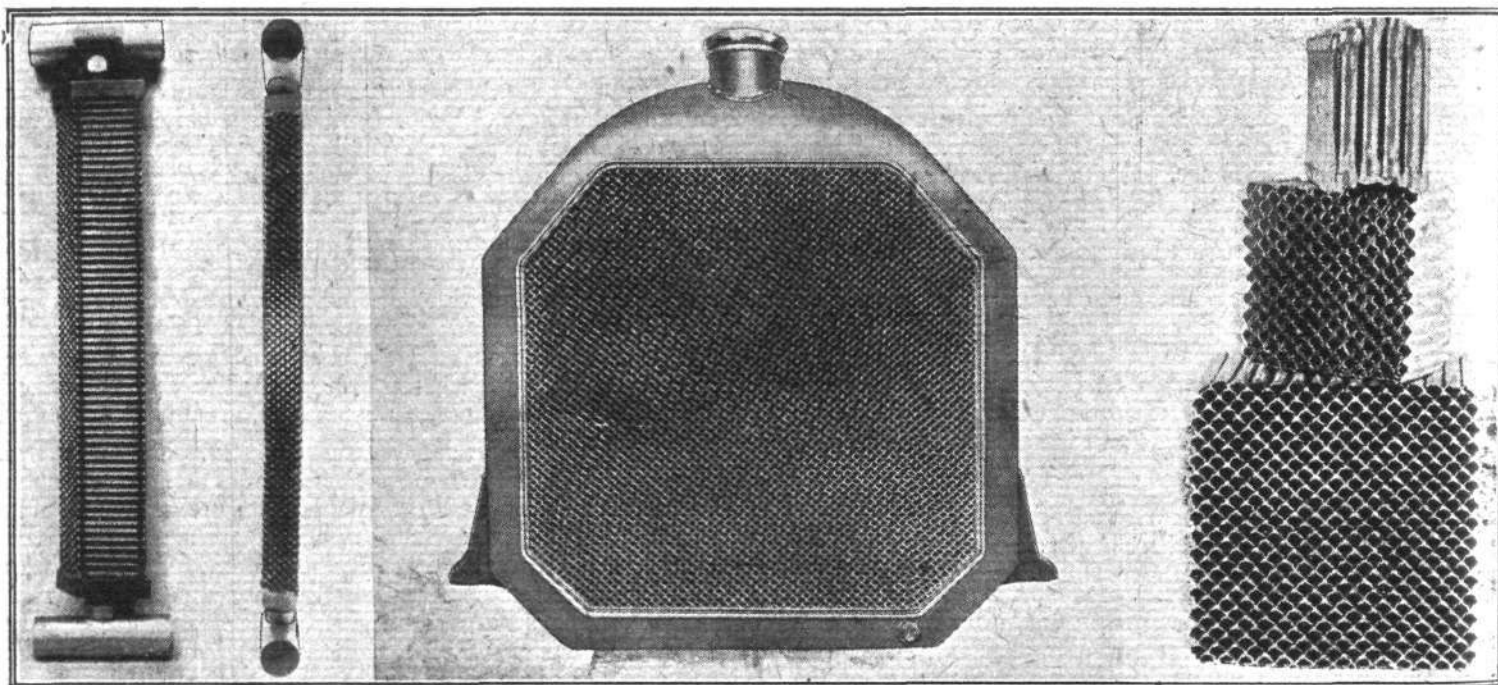
presented by the walls and soldered spaces between adjoining tubes is the smaller, would be the more efficient.

A form of honeycomb radiator which has won great popularity in the motoring world, and which is coming more and more into prominence on modern aeroplanes is the Gallay radiator. A visit to the Gallay works in Scrubbs



Diagrammatic Sketch of the Gallay radiator construction.—On the right is shown a section of the radiator with water passages and air channels, while the diagram on the left indicates the method of building up the honeycomb of separate strips.

Lane, Willesden, reveals some highly interesting facts concerning the design and process of manufacture of this type of radiator. This subject is one on which it is at present difficult to say enough and yet not say too much. Many of the most interesting points cannot, for obvious reasons, be touched upon. However, a brief outline of the principal



**A FEW EXAMPLES OF GALLAY RADIATOR CONSTRUCTION.**—On the left is a Gallay radiator of the standard unit type. The necessary cooling area is provided by adding the requisite number of units for the engine and speed in question. For the same engine, if the speed is greater the number of units is reduced, if the speed is smaller the number is increased. The honeycombs are pivotally connected to the top and bottom water leads, so that by suitable adjustment the rear units can be brought out of the path of the front units. The photograph in the centre shows a Gallay motor car radiator. Note the exceptionally "clean" appearance of the honeycomb. On the right are three sections of the Gallay radiator. At the bottom a 6 ft. 6 in. section showing the semi-circle and quarter-circle formation peculiar to the Gallay radiator. In the centre is a sectional view of the honeycomb, showing clearly the shape and relative size of the water passages. On top is a section of a pointed radiator, lying on its back, in order to show how adjoining strips are staggered relatively to one another to provide the pointed form. This section also shows how the water passages are formed by stamping out the ends of the tubes bell mouth fashion.



features may be permissible. Geometrically the Gallay radiator is very simple, the water spaces consisting of a series of semi-circles and quarter-circles. Reference to the accompanying illustrations will, we think, make this point clear. Each air channel is formed of an endless strip of brass, or, more correctly speaking, of a strip, the ends of which are folded over and joined on a highly ingenious machine. This strip is then placed in a press, on the design of which, by the way, the firm have spent a considerable amount of time and money. In this press the strips are given their typical Gallay formation, and all that remains to do to complete the honeycomb is to solder the ends of adjoining strips together. Owing to the peculiar shape of the corrugations this is a simple matter, since there is no tendency for individual tubes to slip, a difficulty often experienced with round tube types. The strips are placed side by side in the requisite numbers, and are lightly clamped together, ready for soldering. This is done by "dipping" the ends in a shallow tray in which there is just the right depth of melted solder. When finished, the radiators are tested for leaks, of which very few are found, owing to the initial rigid inspection of the brass bands over a box with glass top and in which are placed a number of electric lights. Even the smallest pin hole is instantly discovered during this inspection, and the possibility of a faulty strip finding its way to the presses is very remote.

From our illustrations it will be seen that the edge left between adjoining tubes is very thin indeed, and the amount of solder used, although quite adequate for its work, is reduced to a minimum, no superfluous solder being left anywhere. As to the resistance per square foot of this formation no information may be given under present conditions, but some rough and ready tests showed that the tubes

obstructed the flow of air to a surprisingly small extent. As already mentioned, this firm are making large numbers of motor-car radiators, all the usual forms, such as flat, rounded and pointed, being possible with the Gallay formation. A point in favour of this radiator is that it can be built up in units or sections of almost any size from a couple of inches square to several feet square. More than that, repairs are quickly and cheaply effected, a damaged section being simply removed and a new substituted, or, if necessary, a single damaged tube can be replaced without disturbing the rest.

One of our illustrations shows a new departure in aero-radiator design, at any rate as far as this country is concerned. It consists in building up the radiator of a number of standardised units, in such a manner that, for a given engine, a certain number of units are employed. If the same engine is used on a faster machine fewer units are employed; if on a slower one, more units. This arrangement follows, it will be seen, along the lines of the German Pazet radiator described in "FLIGHT" of December 31st, 1915. A few moments of consideration will suffice to show the advantages of this arrangement. Instead of a different size and shape of radiator for almost every type of machine, varying even in the same machine according to the engine fitted, we have with the unit system a standard unit that can be turned out in quantities without thought of the machine on which it is to be mounted, which is merely another way of saying that it can be manufactured economically and, what is of greatest importance of all at present, quickly. To the Gallay Radiator Co. belongs the credit of having realised the possibilities of the unit system, and it is to be hoped that the authorities will give this method their serious consideration.



#### Casualties.

Second Lieutenant GEORGE EDWARDS, R.F.C., aged 28, previously reported missing, now officially reported killed while flying over the German lines on September 24th, was the second son of the late George Edwards, 134, Kingsland Road, N.E., and of Mrs. Edwards, "Cedar Mount," Mottingham, Kent.

Second Lieutenant GUY HEDDERWICK, Dragoon Guards, attached R.F.C., previously reported missing on September 22nd last, now officially reported as having died on active service, aged 22, was the eldest son of Mr. Philip Hedderwick, of the firm of Stanley, Woodhouse and Hedderwick, solicitors, of Essex Street, Strand. He was educated at Uppingham, and was articled to Messrs. Budd, Johnson and Jecks, of 24, Austin Friars, solicitors. On the outbreak of war he joined the Westminster Dragoons, and served with that regiment in Egypt for one year. In August, 1915, he was gazetted Second Lieutenant in the First Reserve Cavalry, and transferred to the R.F.C. in May last. He joined a squadron at the front on September 7th and was engaged in an offensive patrol on September 22nd, when he was attacked by several enemy aircraft at the same time and forced to the ground in the German lines.

Flight-Lieutenant JOHN DOUGLAS HUME, R.N., reported killed, was the only son of the Rev. David Hume, M.A., Buckhaven, Fife. He was 20 years of age, and was serving his time as an engineer when war broke out. Last spring he was attached to the Persian Gulf Expedition, and had several exciting adventures before his health broke down. Latterly he was on duty in this country.

Captain PHILIP ALGERNON TILLARD, Yeomanry and R.F.C., killed, was 34 years of age, and was the elder son of the late Mr. Philip Tillard and the late Mrs. Bonham

Carter. He formerly held a Lieutenant's commission in the Royal Fusiliers. In 1913 he joined the Yeomanry, and was promoted in March of last year.

#### Married and to be Married.

The marriage of Captain W. B. BRYANS, Norfolk Regiment, attached R.F.C., younger son of Mr. and Mrs. A. Bryans, 8, Talbot Square, Hyde Park, with MILDRED ISOBEL, youngest daughter of the late Lieutenant T. RAMSBOTHAM, R.N., and of Mrs. RAMSBOTHAM, Enniskerry, Exmouth, will take place on January 20th, at 2.30, at St. James's, Sussex Gardens, W.

The marriage of Lieutenant CHARLES HURD HOWELL, R.F.C., and MARGARET RUSSELL, daughter of the late ex-Governor William E. Russell, of Cambridge, Massachusetts, U.S.A., and of Mrs. Michael Foster, of Harrogate and San Remo, took place last Tuesday, at Holy Trinity Church, Cambridge.

The marriage took place on December 12th, at St. Saviour's, Westgate-on-Sea, of Lieutenant ROBERT PEEL ROSS, R.N. (Squadron Commander, R.N.A.S.), only son of the Rev. R. Peel Ross and Mrs. Peel Ross, of Drumm, Inverness, and grandson of the late Captain Horatio Ross, of Rossie Castle, Montrose, to Miss MURIEL KINNARD, youngest daughter of Mr. E. H. Kinnard and Mrs. Kinnard, of Cleveleys, Westgate-on-Sea. The bride was given away by her father, and Flight-Commander C. Butler, R.N.A.S., was best man.

Captain ALAN MACHIN WILKINSON, D.S.O., Hampshire Regiment and R.F.C., was married to Miss LINA SNELL, at St. Barnabas Church, Addison Road, Kensington, last Monday.

## AVIATION IN PARLIAMENT.

### Air Raid Insurance.

MR. INGLEBY in the House of Commons on December 14th asked the Prime Minister whether his attention has been drawn to the remarks of Mr. Justice Sargeant in giving his judgment in the case of *Enlayde, Limited, v. Roberts*, with reference to aircraft damage insurance; and whether, to allay public anxiety on the subject, he is prepared to state that the benefit of insurances against aircraft damage effected with the Government shall enure for the benefit of, as well as the persons in whose names such insurance may be effected, as also of all other persons interested in the insured premises?

Mr. Roberts: The Prime Minister has asked me to answer this question. My attention has been called to Mr. Justice Sargeant's judgment, and I would refer the hon. gentleman to the answer given on this subject to the hon. member for Marylebone East on December 1st, of which I am sending him a copy.

### Air Policy.

SPEAKING in the debate on the Vote of Credit in the House of Commons on December 14th, Mr. Billing said: "I should not occupy the time of the Committee if I thought there would be any opportunity of raising the question of the Air Service before the House adjourns. I quite realise that the new Government—I should like to be among the first to congratulate the new Government—has before it many tasks of greater magnitude, but I would like to ask the present Government that at least they should not take a very definite decision—I am looking to this new Government to take definite decisions—before there has been some debate in this House on the reconstruction of our Air Services. I am sure that the majority of the members of the Committee agree that a reconstruction of the Air Service is absolutely necessary, even more necessary now than it was twelve months ago. The position is more critical to-day, and the employment of a great Air Service is even more important to-day than it was twelve months ago. So far as I can see, the position is this: At the present moment we have a Naval Air Service, whose operations, such as they are, are under the direction of a Lord of the Admiralty. It is not in a position to carry out great operations because of the very reason for its existence—that is, to provide the eyes for the Fleet, because they have not the material for that purpose. They have a great personnel. Their existence as a Naval Air Service is rather difficult. On the other hand, there is the Royal Flying Corps, which is doing excellent and wonderful work in France under the direction of the War Office. The construction of machines is most important. The control of inventions as regards new types, which we are obliged to keep up to date, is one of the most important things. Owing to the friction that has arisen between the various services—the Army and Navy, the Flying Corps and the Naval Air Service—they have now decided, I understand, to put the construction in regard to this highly technical science in the hands of the Munitions Department. I should like to register a protest before that is done. I know the feeling of the whole of the trade in this country. I know that certain officers have had complete control as regards construction both on the naval and the military side. It has been a mistake from the beginning to allow officers of varying rank to have the control of the design and construction of aeroplanes, for the simple reason that on all these Committees that are set up we find a young officer, probably with one stripe on his arm, who is a master of the subject, having to oppose another officer with four stripes on his arm who has only just taken up the work, with the result that there has been and always will be confusion.

"We are not going to solve the question by handing it over to the Munitions Department. To whom in the Munitions Department are they going to hand it over? It is a highly technical job, and it is quite a new science. Are they going to hand it over to officers, because practically every man in this country who understands the science of aviation is an officer, and is either in the Army or the Navy or has joined up. Are they going to take men who are experts from the Army and the Navy, or is the Army to lend them all the experts or is the Navy to lend them all the experts? I should like to ask the Government—and I do it in no carping or critical spirit—to think very seriously at the present moment, and when the reconstruction of what is or what should be a great offensive service is in the melting pot, not

to take the easiest way out. The easiest way is not always—indeed, it is very rarely—the way out. We must have an Aircraft Construction Board, and it would be preferable if that were completely in the hands of civilians. If the construction of aeroplanes, the deciding of the types and the giving of orders is going to be made piecemeal in the hands of the Munitions Department, it will simply make another Department, and you will have to take officers from the Army and Navy or the constructive side of those sections to form that Department. I can assure the Government, from inside knowledge, that if that is done, the Department will not serve and the petty jealousies and that sort of thing which we want so much to defeat will occur. An hon. member opposite, in certainly one of the most stirring speeches I have heard in the House for a long time, raised the question of personalities in clubs. It is the same inside the Services, as a good many officers know. The whole question is, not what shall we do, but who shall do it? The most important thing to decide, after deciding what shall be done, is to start with quite an unbiassed mind as to who is the most capable of accomplishing the task, quite apart from what he is or how many stripes he may have on his arm or how many stars he has on his shoulder. That is how I look at the matter. The position now is highly critical.

"A good deal has been said this afternoon on the question of the submarine peril. I would point out that submarines have to go somewhere to get supplies, and that they have to be constructed somewhere. I would suggest that the submarine is best tackled before it starts out or goes home. Surely our Admiralty are in possession of the facts. They should be in possession of charts and maps as to the position of the submarine bases. I do not want to mention numbers, but I can say that at the present time we have thirty or forty or a hundred or a hundred and fifty times more machines in the Naval Air Service than we had two years ago. We do not know what to do with them. We are lending some squadrons to the Army and are lending other squadrons to co-operate with the French. I would point out to the present Government that it is a mistake to say, "We have got three or four thousand machines which may be required; what shall we do with them?" I am going to suggest something. Fifteen per cent. of the personnel of that Service is being employed at the present time under war conditions. I would ask the First Lord of the Admiralty, so far as the Naval Air Service is concerned, to make a point of employing new squadrons in raiding submarine bases. There ought not to be a day or an hour, having machines of the type that we possess and plenty of them, when the enemy submarine bases are not being attacked. We ought to make submarine attacks impossible by constant and persistent raids—not by intermittent raids, say, one in three days. There is no need to report the raids in the newspapers. There should be one incessant raid of those bases where submarines and enemy destroyers are operating.

"What is even more important is the preparations we are making, both in regard to the policy of construction and the policy of aggression, with regard to the air in the future. I do not want to repeat now any remarks I have made in this House on previous occasions, but I should like to point out that we have in this country at the present moment facilities for producing in the next six months five thousand aeroplanes without interfering in any way with the other munitions of war. If an Aircraft Construction Board could be set in operation you could have those machines in six months, if the design were standardised. I am quite aware that there is a danger of standardising the design for fighting machines or for observing machines, because if the enemy improves on that type of fighting machine he puts you out of the running. But there is no danger in standardising the design of a bomb-dropper. If a machine has a speed of eighty miles and is capable of carrying two, three or five hundred-weights of explosives, provided it is accompanied on its raids by the latest type of fighting machine which is equal or superior to that of the enemy, there is no danger in standardising it. If we are going to produce them in any large number, we must back some design. You can never produce in great number by constantly changing the type. If we standardised the best type of bomb-dropper we might in six months very easily have five thousand aeroplanes of that type without in any way interfering with the output of munitions in this



country, with the exception of the engines. I endeavoured to persuade the late Government, and will endeavour to persuade the present Government, that with respect to the engines we must look to the American market. We cannot, I am confident, produce the engines in this country that we want for the job without seriously interfering with the output of munitions which we cannot get abroad and which are urgently needed. I am suggesting the method, not of taking the American engine, but of standardising the English engine and taking over the American shops for producing it. The only point to be considered is the practicability of doing it.

"We can have the pilots at the same time. I have been trying to persuade the Lords of the Admiralty since December, 1914, that we were wasting our time in training pilots in this country. I have pointed out to them that my experience of aviation has shown me that it is a fortunate day when a young learner gets on an average four minutes in the air in England. In the initial stages of learning to fly, the atmospheric conditions must be more or less favourable. The result is that these young fellows are waiting about the aerodrome for their turn or for the weather. You can go to these places and find fellows who have not been up for a week. I understand that we have approached the French Government, that we have got their permission, and that after twenty-eight months of war and twenty-four months of persuasion someone has gone to the South of France to see if he can select a site. I would persuade the Government to take the matter in hand and to put it in charge of somebody. It does not matter whether it is under the Army or the Navy. Get rid of the intrigue in every way you can. Make it somebody's job—a civilian's job—to go to the South of France and provide facilities for training 500 pilots a week. That is a sweeping statement, but it is possible that with 100 machines—I say that we have now in this country 2,000 machines that could be employed—or 200 machines in the South of France, where the climatic conditions are favourable, we could be training pilots for twelve or fourteen hours a day, instead of merely early morning and afternoon, as we do at home. I would ask hon. members to consider what might have happened if we had started in February of this year a definite constructive policy, always having at the back of our heads a definite offensive policy, after consultation with those men who have had experience in operations in the field or in operations of bombardment by aeroplane, and to consider what we might do with 5,000 aeroplanes. What a different complexion we should have put upon the War? To carry out what I propose would create a public opinion in Germany, and would show that we were really carrying the war into their country. That was a view which I stated some time ago, and if it had been adopted six months ago, or even two months ago, we should have had this air service. The task is not an insurmountable one in any way.

"I have been asked when I thought the war would be over, and my reply was that I thought it would be at an end twelve months after the Government wakened up; and I can assure hon. members that if only we took up this question of the air service seriously now, in six months' time we should be able to introduce a greater offensive still. It is because I believe this so seriously—and my belief is not founded on mere ideas but upon experience—it is because I believe in the possibility of a great air service, that I beg the Government to take the whole matter seriously into their consideration directly the opportunity arises. I beg them, however, not to take a short cut by handing the construction of aeroplanes to the Munitions Department or to anybody willing to undertake it. In France, the Army has every machine it wants, and I ask the Government to give to the Army or the Navy every machine it wants, where it is proved that it would be of value to either. In regard to the Naval Air Service there is no justification for employing a gigantic personnel—no reason either on earth or on the sea. I would comb out some of them, as well as some of the Royal Flying Corps, and I would ask the Government to form this air service, and call it an Imperial air service if you chose, but it is no matter what you call it so long as it is created a separate service, a unit apart from the Army and the Navy, as a great aerial offensive service, which could operate under the direction of the Army, if you like, or it could be left to the Navy when necessary. But, without being critical of the Naval Air Service and its functions, or of the Royal Flying Corps, I submit that they are not the material which is wanted. There are firms in this country which are still competing with each other, and the Naval Air Service, the Royal Flying

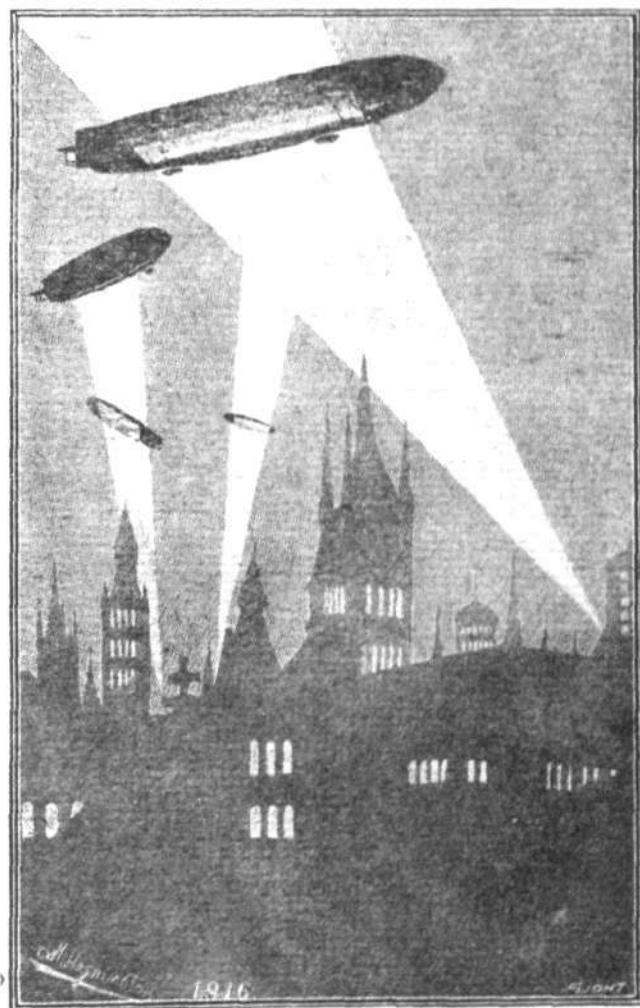
Corps, and now incidentally the Munitions Department, are concerned in this matter. I submit that the present Government should make a clean sweep, as they can do before any influences are brought to bear in one way or the other, and proclaim its intention of creating a Ministry of Construction or a Board based on the same principle as the Naval Construction Board, and this Air Construction Board would then be solely responsible for supplying the wants both of the naval branch and the military branch of a great Imperial air service, which I sincerely trust before the end of the war will come into being.

#### Parliamentary Secretary for the Air Board.

SPEAKING on the second reading of the New Ministers and Secretaries Bill in the House of Commons on December 18th, Sir G. Cave said: "We propose by the Bill to appoint a Parliamentary Secretary to that Board. The Government desire to go somewhat further than that. This matter is, of course, of great and pressing importance, and I think many of us would desire to have a decision as to the position which the Air Board is to take. I am authorised by the Prime Minister to say:

"In the pressure of work involved in the formation of the Government, it has not been possible to decide to-day all matters connected with the Air Board. The work of President is still being carried on temporarily by Lord Curzon, and the Government have satisfied themselves that the service is not suffering in the interim. But I am glad to be able to say that the two fighting Departments (the War Office and the Admiralty) have arranged to utilise to the full the services of the Air Board, and I hope in the Committee stage to be able to introduce Amendments to give effect to that decision."

"I hope that with that statement the House will be content."



How the Germans report for home and neutral consumption their aircraft as strafing London, as conceived by the Japanese artist "Hashimoto."

From the Japanese "Aeronautic World."



## AIRISMS FROM THE FOUR WINDS.

THE Final Report of the Committee, presided over by Mr. Justice Bailhache, on the Administration of the R.F.C., was laid on the table of the House of Commons on Tuesday, and was issued to the public on Wednesday evening. It favours considerable development of the Air Board.

IN the death of Mr. R. A. Yerburgh on Monday at the age of 63, Imperialists have lost a great and enthusiastic worker. As President of the Navy League for the past 16 years Mr. Yerburgh has helped to counter the machinations of the Little Navy plotters, and of late years he realised the importance of aviation as a military and naval asset. It was at his instigation the scope of the Navy League was enlarged to embrace aviation and to promote its progress as a vital national necessity. His political career stands out with a clean sheet, and is one that might well serve as a pattern for a few of the job and salary hunters who regard their entry into Parliament as merely a means to the end of pulling the nation's leg to their own advantage. Mr. Yerburgh's generous personality will be much missed, especially amongst those for whom his endeavour was ever to provide a little healthful help and relaxation.

"Two aeroplanes made a forced descent near Newbury on December 8th. On one of the flying officers going to the local post office to telephone to headquarters to send a relief gang, he was told that he would have to wait, as the line was held up for the Newbury races!" A. G. W., who writes this little Christmas story, asks "Are we at war?" Perhaps we'll know presently, from Mr. Lloyd George.

"COMBING-OUT" has set in in the R.N.V.R.A.A.C., and some people think none too soon. As a result, men over military age are required to fill the gaps left by those fit for general service abroad. Here's a chance for a lot of hefty youngsters of 45 and over who are anxious to do a bit in the war, to get into communication with the headquarters of the corps at 4, Whitehall Gardens, and find out what the conditions of service require.

SOME quaint quandaries have arisen in all sorts of unexpected quarters from the lighting regulations in force in London and the country generally. Here is another almost Gilbertian situation which saw the light the other day during a case at Lambeth County Court when Judge Parry asked the Registrar (Mr. W. B. Pritchard): "Who is responsible for the lights if we sit after five o'clock? The Registrar says that the judge is liable. I say that the Registrar is." Counsel quickly rose to the situation with the remark: "We shall be pleased to act for you as counsel at the police court, whoever is summoned."

A GRACEFUL and thoughtful action by King George is the conferring last week upon the three sisters of Earl Annesley, who succeeded his cousin (killed in action while in the Royal Flying Corps in 1914), the rank and title of an Earl's daughters, as if their father, the late Hon. William O. B. Annesley, had lived to become Earl Annesley.

WE have the word of Lieut. C. Douglas, R.F.C., at a meeting of the Scottish Meteorological Society on Saturday, that the field of view from an aeroplane is so extensive that distant thunderstorms are easily discernible, he having "spotted" clouds 100 miles off from a height of 8,000 ft. Which gives point to a diagram published in "FLIGHT" upon this subject not very many months back.

THE Northampton Polytechnic has a very fine record in war work. At the recent prize-giving, Dr. R. Mullineux Walmsley, the principal, mentioned that 52 members of the staff, 185 members and 329 students had joined the Colours, of whom 90 had obtained commissions. In other

unspecified ways the school has assisted in the manufacture of high-class munitions, whilst the equipment and staff of the Polytechnic have been placed at the disposal of the Government for experimental and scientific work. The Northampton establishment is a valuable national asset at all times, and has now proved its practical uses in War emergency as in Peace times.

AN echo of the untimely death of Lord Lucas, whilst flying over the German lines, is to hand in the news that his observer at the time, Lieut. Lex Anderson, R.F.C., in some way not explained escaped death and is a prisoner with the enemy. Truly a case of the luck of war, for which his father, Professor Anderson, President of Galway University College, is duly grateful. *A propos* of the late Lord Lucas, a very human sketch of his life appears in the December issue of *T.P.'s Journal*, as well as some personal notes of interest touching upon the life of the late Sir Hiram Maxim.

QUITE a goodly proportion of the officers in the last batch of British prisoners of war who have arrived at Berne from Germany are of the R.F.C. These are Lieut. John Firstbrook, R.F.C., Second Lieut. John Macfie, R.F.C., Second Lieut. Macaskie, R.F.C., and Second Lieut. Cuthbert Selby, R.F.C. They are fortunate to have got clear of German soil.

LEVÉE EN MASSE.—THE CRANK: "Your Highness, I have here a scheme that will save many of your wonderful airships from destruction. It is a shell-proof envelope 6 ins. thick."

THE COUNT: "Of what material?"

THE CRANK: "Iron, your Highness."

THE COUNT: "Why, you idiot, how do you expect the airship to rise?"

THE CRANK: "It doesn't, your Highness. That is the sole purpose of my invention."—Punch.

### TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister Journal) of December, 1906. "FLIGHT" was founded in 1908.

#### THE BELLAMY AEROPLANE.

In this country has arrived, with a suddenness which suggests the proverbial "bolt from the blue," Mons. Bellamy, whose ultimate object is nothing less than to make an attempt for the £10,000 prize offered by the *Daily Mail*.

The Bellamy aeroplane consists of a bamboo structure carrying a double-decked aeroplane at each end. In front each plane measures 10 metres by 2.75 metres, those at the rear are the same width, but only 7 metres long. Front and rear aeroplanes are situated 10 metres apart, and lying longitudinally between them are two triangular side-sails inclining upwards and outwards like the wings of a bird. Between the upper and lower aeroplanes at each end are vertical partitions, which give a cellular formation to the aeroplane as a whole. Projecting in front is a horizontal rudder, while behind, in the centre of the rear aeroplane, is a vertical tail. In this latter device, M. Bellamy states that he realises a fault, so that at present it is unnecessary to consider it too seriously as part and parcel of the apparatus. Power is developed by a 50 h.p. engine situated in the centre of the forward aeroplane, from which it is transmitted to tractor screws by chains. The aeronaut's seat is situated immediately behind the engine.

At the present time, M. Bellamy's claim for free flight is, we understand, a distance of 400 metres, so that there is still very much to be done before the Bellamy aeroplane can be regarded as having solved the problem of aerial navigation; the presence of the inventor in this country, however, is at least evidence that he himself looks upon his experiments as already progressing along very satisfactory lines.



# Answers to Correspondents.

If in doubt about anything aviatric, write to "FLIGHT" about it.

**L. L. (Coventry).**

As regards weight, a wheel like that mentioned in your letter would, we should think, be a good proposition, but the authorities will not accept steel wheels, as these affect the compass. Some non-magnetic material, such as aluminium or phosphor bronze must be used.

**B. A. C. (Shirley).**

The particulars asked for in your letter are as follows:—125 h.p. Anzani engine: Weight 460 lbs., 1,200 r.p.m., fuel consumption about 9 gallons and oil consumption about 2.3 gallons per hour. 60 h.p. Beatty engine: Weight, 243 lbs., 1,600 r.p.m.; fuel consumption, 4.28 gallons per hour. 150 h.p. Sunbeam: Weight, 610 lbs.; petrol consumption, about 11 gallons per hour, and oil consumption about  $\frac{1}{2}$  gallon per hour; speed, 2,000 r.p.m. engine, 1,000 r.p.m. propeller shaft. 100 h.p. Gnome: Weight, about 320 lbs.; speed, 1,200 r.p.m.; fuel consumption, 10 gallons per hour, and oil consumption 2 gallons per hour.

**E. E. H. (Kettering).**

The books "Aeroplane Design," by F. S. Barnwell, "The Design of Aeroplanes," by A. W. Judge, and "The Aeroplane," by A. Fage, all deal with "modern" practice, but do not give detail information concerning machines built during the war. Such information is not, as a matter of fact, allowed to be published during present conditions.

**P. N. (Gt. Malvern).**

We have not yet come across, except in our dreams, an "aerial outfit that will drive an ordinary bicycle from a rate ranging from a walk to 60 m.p.h., and do 100 miles to the gallon with a single cylinder engine of 4 h.p., driving a propeller of small diameter, but of high pitch, and which can also be used for a small boat at the rate of eight miles per hour, and for ice craft." Down a good long steep hill, with a following wind, or for preference a dive from the top of a cliff, the figures *might* be approached, but on the level—well, hardly.

**G. C. B. (Broadstairs).**

There is no book published at the present time giving the information and illustrations you desire.

**A. C. (Tunbridge Wells).**

You should write to the R.N.A.S. recruiting office, Brook Green, Hammersmith, giving full particulars. They would tell you if there are any vacancies.

**Air-Mech. (R.N.A.S.).**

Having obtained approval of your C.O., you should obtain the necessary form from Adastral House, E.C., and, having filled it up, send it forward through the usual channels.

**W. G. N. (Norwich).**

You should write to Major Mitchell, R.F.C., Regent's Street Polytechnic, London, W., giving full particulars of your experience.

**T. M. S. (Peterborough).**

Your experience should certainly help you. Write to the

Secretary of the Admiralty for a copy of Regulations for the Special Entry of Officers into the R.N.A.S. That will give you all the information you require.

**G. F. F. (Mill Hill).**

We are afraid your defective eyesight would debar you from getting a commission in the R.F.C. Why not inquire at Adastral House?

**T. W. E. E. (Cardiff).**

You should write to Adastral House, London, E.C., for the necessary form, and, having filled it up, send it to the Director-General of Military Aeronautics at the same address. You do not have to buy the commission.

**A. V. W. (Thornton Heath).**

1. There is no need to attest. 2. Send in your form as soon as possible. 3. We do not think so. 4. You should send copies unless the originals are asked for. 5. The salary can be made to cover ordinary requirements if care is taken.

**N. W. (Newport).**

We regret the Defence of the Realm Regulations preclude us from giving the details you desire. We believe the pay when training is 7s. 6d. a day. Kit allowance £50. See also "FLIGHT" for November 9th, page 984, for rates of pay of R.F.C. officers.

**S. H. I. (Tufnell Park).**

You can hardly do better than study Burt's "Aero Engines," which can be obtained from "FLIGHT" offices for 8s. 10d. post free.

**E. J. E. H.**

See reply to G. F. F. (Mill Hill).

**W. M. (Robertsbridge).**

The R.F.C. Cadets Battalion is for training officers for the R.F.C., and you can obtain full particulars from Adastral House, E.C. There is not a similar battalion connected with the R.N.A.S.

**103661 R. E. (Oxford).**

In the wireless installation on an aeroplane, the "earth" connection of the aerial is formed by a counterpoise or balancing capacity, which is obtained either by joining up all suitable metal parts of the machine, or by a system of wires entirely separate from the aerial. This "earth" should not be confused with those obtaining in other electrical circuits, such as the telephone, where the earth actually forms the return conductor of the circuit. The only connection formed between one aeroplane and another, or a land station, is by the radiating waves set up by the surging currents produced in the aerial. A series of very interesting and instructive articles on "Special Problems of Aircraft Wireless," by H. M. Dowsett, appeared in *The Wireless World*, commencing December, 1915, which you might find helpful.

**Hack (Mare Street).**

1,200 lbs. h.p. producing only 25 would hardly appear to be a business proposition—1,200 gs. h.p. would rather make it worse. Facts, like money, are hard things to get away from.

## BRITISH AIR WORK.

The following typical items descriptive of the work done in the field by the Royal Flying Corps in France was issued by the Air Board on December 18th:—

"Bombing: Nov. 14th. Ten of our pilots carried out a series of successful raids by night. Stations and rolling-stock were attacked with bombs, two of which hit a moving train, bringing it to a standstill.

"Nov. 16th. Six of our machines bombed an enemy railway station. Six coaches were blown off the lines and two station buildings destroyed. Other rolling-stock was damaged.

"Nov. 21st. One of our machines (Capt. B. and Lieut.

H.) from a height of 500 ft. dropped three bombs on some enemy lorries. The bombs having missed, the machine turned and flew over the lorries again and dropped three bombs in the middle of them. Turning again, our Observer turned his machine gun on the enemy from a height of 150 ft.

"Enemy Artillery losses: According to statements made by some prisoners of a German Artillery Regiment, large numbers of the enemy guns have been put out of action by direct hits, and they ascribed this to the accurate work of our air observation. Gun crews often had to retire and leave their guns for hours at a time."

# AIRCRAFT WORK AT THE FRONT.

## OFFICIAL INFORMATION.

**British.** *General Headquarters, December 12th, 10.12 p.m.*  
 "Yesterday three enemy aeroplanes were accounted for, one of which fell inside our lines. One of our machines is missing."

*War Office, December 13th.*  
 "Salonica.—On the Struma front our aircraft reconnaissances continue."

*Admiralty, December 15th.*  
 "On the 14th inst. a squadron of naval aeroplanes carried out a bombardment of Kuleli-Burgas Bridge, south of Adrianople. A great weight of bombs was dropped and extensive damage is believed to have been done."

*Admiralty, December 16th.*  
 "On the 15th inst. an attack was carried out by a squadron of naval aeroplanes upon Razlovoi, 60 kiloms. (37½ miles) east of Ishtip, Serbia.

"A large number of bombs were dropped with effect, many hits being observed."

*War Office, December 16th.*  
 "Mesopotamia.—During the night of the 14th-15th our aeroplanes, flying by moonlight, successfully attacked the pontoon bridges on the Tigris, which the enemy had removed from their sites and was towing up-stream. The matériel was broken up and scattered."

*War Office, December 18th.*  
 "Salonica.—Our aeroplanes dropped bombs on Tumba Station and inflicted damage on some enemy transport on the Ghevgeli-Chernitsa Road."

**French.** *Paris, December 12th.*  
 "Salonica.—One enemy aeroplane was brought down on the Struma front. Our air service bombarded the enemy cantonments in the region of Doiran and the Vardar Valley."

*Paris, December 13th.*  
 "Salonica.—A German aeroplane was destroyed by the fire of our artillery near Bouvaucourt.

"An enemy aeroplane, compelled to come down, was captured by an Italian detachment. The two officers manning the machine were taken prisoners."

*Paris, December 15th.*  
 "In spite of the unfavourable weather, the air service played a brilliant part in the fighting [at Verdun]."

"Salonica.—The Allied air service displayed great activity. One enemy machine was brought down south of Petrik."

**Russian.** *Petrograd, December 14th.*  
 "Our aeroplanes successfully dropped bombs on the Plouiov Station on the Tarnopol-Zolotchov Railway, and on a transport near the village Nouchtche, which is north-east of this railway."

*Petrograd, December 15th.*  
 "Yesterday our aeroplanes fought three aerial actions in the region of Zalovce, Luchce, and Mlynovce, and on each occasion drove back the enemy to his own lines."

*Petrograd, December 16th.*  
 "In the Black Sea, in order to destroy the flour mills which are supplying the Bulgarian Army, our warships on December 13th successfully bombarded the port of Baltchik. They were unsuccessfully bombarded by the enemy's shore batteries and attacked by his hydroplanes and submarines."

*Petrograd, December 18th.*  
 "In the Boldury region an enemy captive balloon was carried by the wind behind our positions. We are without information as to its descent."

**Italian.** *Rome, December 13th.*  
 "On the Carso one of our aeroplanes attacked an enemy kite balloon, which fell in flames near Ternovizza (Ternwica), north-east of Nabresina."

**Serbian.** *Salonica, December 15th.*  
 "Yesterday was also marked by great aerial activity on both sides."

*Salonica, December 16th.*  
 "Yesterday (December 15th) there was artillery fire on both sides without any infantry action, and great aeronautic activity."

**German.** *Berlin, December 18th.*  
 "Enemy columns retreating to Braila were attacked with visible effect by our air squadrons."

**Austrian.** *Vienna, December 14th.*  
 "Austro-Hungarian airmen shot down an enemy battle aeroplane over Commanesci. The machine turned upside down and crashed into a wood."

**Bulgarian.** *Sofia, December 12th.*  
 "Hostile aerial activity at Porto Lagos was without result."

*Sofia, December 14th.*  
 "There was lively activity on the part of enemy airmen over our positions and in our rear. Several of our aeroplanes successfully dropped bombs on the British bivouacs and dépôts near Tchaizaza."

**Turkish.** *Constantinople, December 18th.*  
 "We destroyed the enemy aeroplane which had been brought down by our fire, as announced in our yesterday's communiqué."

## AIR WORK IN MESOPOTAMIA.

THE following pen-picture of the work of our flying officers in Mesopotamia was sent by Mr. Edmund Candler from Aral Village, Mesopotamia, on October 28th:—

"Up in the air one loses the mirage. Immediately you leave the ground things cease to be blurred. The dancing images and amorphous shapes of a level horizon become infantry, or sheep, or camels. The eye in the air is nowhere so essential as in the desert, where all objects conspire in illusion."

"I heard a subaltern observer describing an action early in the campaign when he was in the only machine available at that particular time and place, and he had no wireless. The whole thing seemed so simple and easy from his perch in the air. He could see our own cavalry and the enemy's approaching each other in the haze, neither having any idea of the other's existence. He felt that he could turn the tide of battle, or rather turn an inconclusive engagement into a big coup, if only he could make himself heard. But down below everything was obscured in mirage, and so we may have missed a chance."

"But that was in an early phase of the show. We have had time to make good in the air since then in man-power, machine-power, staff, and material."

"Our ascendancy in the air is as complete here as in France. The closest touch has been established between artillery commanders and pilots and observers, with damaging

effect to the enemy's guns. Air photography, as a means of charting a hostile and unsurveyed country, has been brought to a scientific finish. Hangars have reduced the wastage of our machines, which in the earlier days warped and shrank in the alternate rain and sun. By constant bombing raids, especially at night, we have established an aggressive offensive. The result of fights in the air has been that a week often passes without a sight of a hostile aeroplane."

"Low flying, no easy thing in the dark, has become the rule of late. In a raid at Shumran the other night one of our machines was hit by spinters, from its own bomb. The effective machine-gun fire near the ground, in co-operation with our cavalry, has been the most remarkable development in the air. Our aeroplanes have become the terror of thieves, raiders, and irregular horse. It is impossible for them to get off with their loot in the morning. No nullahs are deep enough to hide them. Our machines, flying a few feet above ground, scour the whole desert, rake their hiding-places with machine-gun fire, scatter and pursue their cavalry, spreading panic among their horses, and round up the retiring convoys, while our cavalry follow up and bring back the spoil. Such was the result of an attempt to raid our camel transport at Sheikh Saad. Of course, an action of the kind would be impossible over the enemy's position, but on the line of communications it is most effective. Our flying men have discovered a short way with raiders."



"A country where the elements are so perverse as they are in Mesopotamia must have its air disabilities. At different altitudes you meet currents blowing in contrary directions, and the change as you pass from one into the other makes very bumpy flying. This is an accentuation of the atmospheric conditions which at one time we re referred to as 'air-pockets,' the popular idea being that the machine suddenly found itself in a void through which it fell, having no supporting envelope until it reached normal atmosphere again.

"Though the wind currents over the desert are eccentric, the *Shamal*, or north wind, blows at some level or other all through the year. If it is not blowing on the ground you will strike it in your machine if you go high enough. Sometimes the air is calm at the ground level, while there is a gale blowing at 5,000 feet. Or you may ascend in a gale, which increases in violence until you have passed an altitude of 6,000 feet, when you strike an atmosphere where it is perfectly smooth going. In the hot weather, conditions for flying are very trying. At night and in the early morning the air at 500 feet is far hotter than on the ground, and it becomes hotter and hotter until you reach 3,500 feet. You must make 6,000 feet before you begin to feel cool. The intense heat thins the oil; you can never run your engine full out or she will get red hot. You lose 20 horse-power at a temperature of 115 degrees. Long flights are impossible. After 9 a.m. the heat makes conditions most adverse for flying, and there is nothing doing in the evening. The wood warps and shrinks in the sun. New machines have to be rerigged when they come out, and the dust chokes the engines. The sand rises in clouds and blows as high as 4,000 feet.

"During the last rainy season mud sometimes put our machines out of action. After a single day's rain at Oran a 90 horse-power engine and eight men could not move an aeroplane in the driest part of the aerodrome in the driest part of the camp. Then there are the floods. An aeroplane at Kurnah or Nasiriyeh, between April and July, has the same difficulty in finding a dry spot as Noah's dove. And it is much easier to land than to get away. At the beginning of the campaign, when we were operating in country where the tribesmen were in the pay of the Turks, the landing difficulty increased the odds against our airmen. An aviator going up to Nasiriyeh in July, 1915, had to land in an inundated area. He was able to bring his machine down in the flooded water on the friendly side of the river. He escaped with his revolver and rations as the Arabs on the other bank

made for the machine, but friendly Arabs opened fire on them and scattered them, and the aeroplane was recovered intact. During the return from Nasiriyeh, two machines came to ground, one alighting near Khamisiyeh. It was just after the defeat of the Turks, and a responsible Shaikh received the pilot and entertained him hospitably. The other machine came down the same day within 15 miles, but it fell amongst defeated and retreating auxiliaries, who were in no mood to give quarter. Both pilot and observer were killed.

"Now we are having things very much our own way, though the enemy have brought out some good machines, fine fliers, and gallant men. Their two Fokkers disappeared after a fight with our airmen on August 13th, and have not been seen since. One landed well within the Turkish lines; the other on rough ground by the Tigris bank, where it was broken up by our gun fire. Since this our machines have carried out their work unmolested. One of our pilots made a great sensation in the Turkish camp the other day when he looped the loop and cartwheeled over Kut in contempt of their Archibalds. Prisoners tell us that this derisive little bit of bravado impressed our friends immensely.

"Chaff is exchanged freely between the rival Flying Corps. Many of the enemy pilots are Germans, but even the Hun can become a gentleman in the air. His nature seems to improve with the element he frequents. Most gross on earth, less gross at sea, least gross in the clouds.

"Apparently, altitude purges and refines, or it may be that the finished clod does not take to the air in the beginning. A 100-lb. bomb, or a drum of machine-gun bullets are a better currency than chaff, but our air scrapping is none the less formidable for the high spirits in which the Flying Corps goes into action. Smith inquiries of Schultz: 'Why don't you use the aeroplane we left you at Kut? Can drop you spare parts if they are any use.' It was a mere shell of a machine, and information had come through that they were trying to put a German engine in it. 'Go on dropping bombs on our aeroplane,' Schultz retorts; 'it is from 800 to 900 metres high, and you haven't done any damage yet. By the way, we have a machine that will strafe you, born of an English mother by a German father (engine), an improved 1916 type.' Hence its barbarous hum (*barbarische Hummen*). The English illustrated papers, when they contain anything which may penetrate the Hun epidermis, are dropped on their aeroplanes. *Simplicissimus* and *Jugend* rain upon ours."

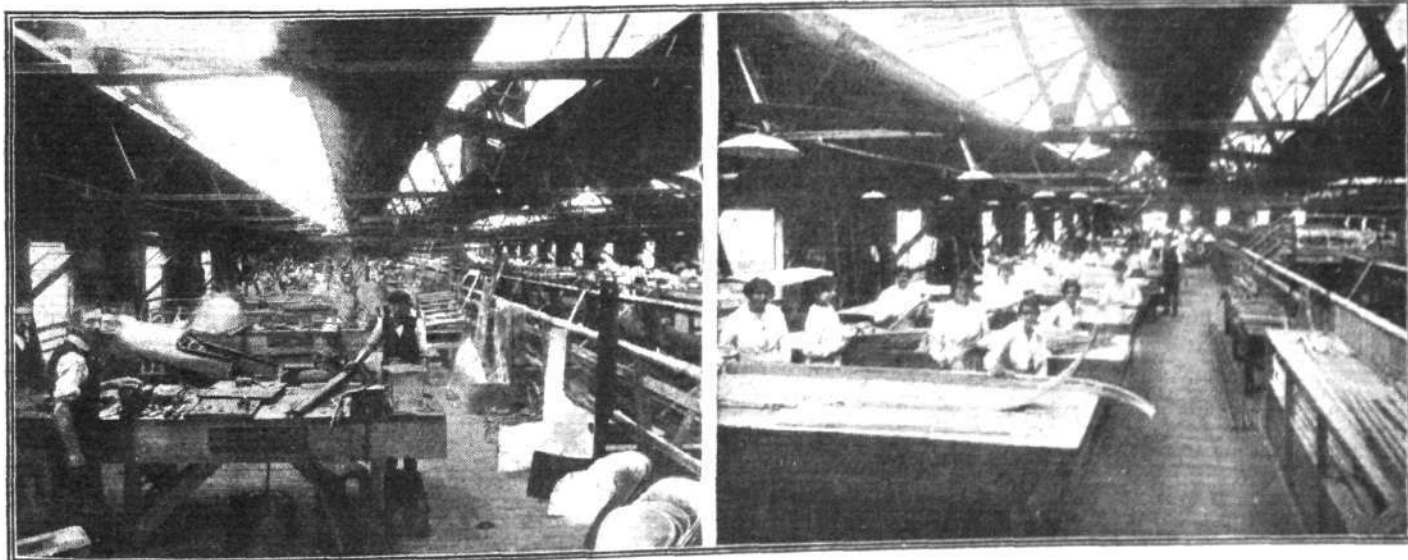
#### Air Work in the Verdun Push.

WRITING from Verdun on December 15th as an eyewitness of the Verdun battle, Mr. G. H. Perris in his despatch to the *Daily Telegraph* makes the following reference to the work of aircraft:—

"Heavy purple clouds filled the sky, but only a few scurries of rain and sleet fell during the day, and the dark hillsides rising toward the central crest of Douaumont remained clear of mist. This was an important advantage, for the French aviators were able to carry on without cessation their valuable

work. Despite a strong and icy wind, the great biplanes and the little Nieuports came and went, while a dozen sausages held permanent guard at the end of their long cables. There must have been some German planes near the front, but I did not see one on our side of the lines, and I only saw one German observation balloon, and that was falling like a huge torch beyond Douaumont, an incident typical of the enemy's day.

"Everywhere the sky is splashed with the rising and falling flames of signal rockets, and in every part of the front intrepid airmen swim in and out of the zone of death."



IN THE WHITEHEAD AIRCRAFT WORKS.—On the left a wood-workers' gallery, and on the right a shop showing some of the women workers.

## SIDE-WINDS.

THE thick fog which settled on London on Saturday last rather upset the calculations of many who had anticipated having a good time at the Annual Works Christmas Dinner of Handley Page, Ltd., which took place at the Holborn Restaurant. As a matter of fact, Mr. Handley Page himself was a victim, but arrived only a quarter of an hour late, and relieved Mr. Theodore Page, who had meantime most ably deputised in the Chair. Among the 250 to 300 employees and their friends who were present, there was a goodly muster of the women workers, and Mr. Handley Page, in his reply to the toast of "Success to the old Firm," proposed by Mr. H. Whitmee, emphasised the splendid work which the women were doing by way of helping to win the war. He also mentioned that, although the firm's machines had secured several world's records in the way of passenger-carrying, &c., they were by no means content with their achievements, and had even better things up their sleeve. Speeches were commendably few, but an excellent musical entertainment had been arranged, and fortunately only two artistes were reported missing.

In one way the fog was a friend to those who went to the dance of the Wells Aviation Swimming Club at the Chelsea Town Hall on Saturday, for if every one who intended to had turned up, there would have been no room for dancing. Although it was only started this year, the Club—thanks to the generous support of the firm and the enthusiastic work of the Swimming Captain, Mr. Guy W. Davis, and the Hon. Secretary, Mr. Frank Blakey—has had a most successful season, and Mr. Wells, the President, was confronted by a fine array of prizes to distribute. Among them was a fine challenge shield, presented by the firm, for an inter-departmental competition, and this year the Staff hold it. The Club has a promising ladies' section, but all the contests arranged for the past season fell through for lack of support. As the section includes a Chelsea champion, however, it is hoped that at the next annual dance the fair sex will be numbered among the prize-winners. There were many striking and effective costumes at the dance, but, strangely enough, aviation had not inspired any of them, with the possible exception of the lady who took the first prize for "Shavings," and who had cleverly utilised the waste of the rib shop for decorative purposes. The judges for the fancy dresses were Mr. Wells, Mr. Doyle Jones and Mr. Walter Jones. Unfortunately Mr. Wheatley, the new works manager, was unable to be present.

Wood screens are quite useful in their way, but they are not much good if it's wood-screws, whether they be brass or iron, you want. So it should be noted that it was wood-screws, both brass and iron, which Messrs. Whiteman and Moss, Ltd., of 15, Bateman Street, Dean Street, W., were offering last week in their advertisement. The screen part of the wording was only the compositor's version of the goods available for constructors.

A BURBERRY waterproof garment is a thing to be desired, and many, whose only opportunity to achieve their ambition in this direction is at the Burberry half-price sale, will be relieved to hear that this annual event will be held as usual. It opens on January 1st at their showrooms in the Haymarket. By copious dilution of their several staffs with female substitutes and vigorous recruitment of skilled men, too old or otherwise exempt from military service, Messrs. Burberry have been able to carry on, and to offer at the coming sale a great array of very attractive bargains in waterproof topcoats, gowns, hats and suits. The quality of Burberry cloths and garments is testified to by their earned reputation, but it is obvious that if, in wearing and protective properties, they can emerge successfully, as they have, from the strenuous test of 30 months' war in all climates, they are more than efficient enough for the ordinary experiences of every-day open-air life in this country, severe as that may be. In addition to weatherproof overcoats of Burberry's many exclusive designs and materials, there are a large number of gowns and completed suits, models which are still the height of fashion and likely to remain so. These are available in exhaustive varieties of texture, weight, colour and patterns, which are uniformly beautiful and artistic. A limited number of military service jackets, slacks, breeches and short-warms are also included in the sale. Much of the

stock is to be sold at one-half—and in some cases at less than one-half—current prices, and other portions are marked down to the very lowest figures that the cost of production justifies. A post-card to Burberry's, Haymarket, London, S.W., asking for sale list, will receive immediate attention, and an early visit of inspection is cordially invited.

THE Rotax Motor Co. advise us that Mr. C. Benson, lately Works Manager of the Arrol-Johnston Co., has left that firm and has joined up as Works Manager of the Rotax Co., from December 1st. The increasing scope of the important work being undertaken by the Rotax Co. is the reason for this change. Mr. Benstead, until lately Works Manager of the Rotax Co., will devote himself entirely to the electrical side of the business.

THE Rotax Co. are fortunate in being able to obtain the services of Mr. Benson, whose workshop experience is a very extensive one, for he has put in terms with large engineering firms both in the States and in Germany, in addition to his extensive experience in this country, which comprises such firms as Messrs. A. Herbert, Ltd., David Brown and Sons, Humber, Ltd., in addition to the Arrol-Johnston Co.

In accordance with the official announcement made by the Ministry of Munitions regarding the Christmas holidays, the offices and works of Messrs. C. A. Vandervell and Co., Ltd., of Warple Way, Acton Vale, W., will be closed from Friday evening, December 22nd, until Thursday morning, December 28th. The above is subject to any change which the Ministry of Munitions may announce.

## FROM THE BRITISH FLYING GROUNDS. Grahame-White School, Hendon.

STRAIGHTS with Instructors last week: Messrs. Child, Pearman, Scudamore and Shaver. Circuits with Instructors: Mr. Fielding. Circuits alone: Messrs. Balden, Coltman, Flynn, Green, Nightingale, Robertson, Shaw and Travers. Instructors: Messrs. Winter, Pashley, Biard, Hale, Fitzsimons and Meering.

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